INTER C.A. – FINANCIAL MANAGEMENT

INDEX

ACCOUNTING RATIOS

To be Discussed only in classroom

(Sol-1)

(a)   **Workings Notes:**

1.	Net Working Capital	=	Current Assets – Current Liabilities
		=	2.5 – 1=1.5

Thus, Current Assets $= \dfrac{\text{Net Working Capital} \times 2.5}{1.5}$

$$= \dfrac{4,50,000 \times 2.5}{1.5} = \text{Rs.} 7,50,000$$

Current Liabilities = Rs. 7,50,000 – Rs. 4,50,000 = Rs. 3,00,000

2.	Sales	=	Total Assets Turnover × Total Assets
		=	2 x (Fixed Assets + Current Assets)
		=	2 × (Rs. 10,00,000 + Rs. 7,50,000) = Rs. 35,00,000
3.	Cost of Goods Sold	=	100% – 20%= 80% of Sales
		=	80% of Rs. 35,00,000 = Rs. 28,00,000

4.   Average Stock $= \dfrac{\text{Cost of Good Sold}}{\text{Stock Turnover Ratio}}$

$$= \dfrac{\text{Rs.} 28,00,000}{7} = \text{Rs.} 4,00,000$$

Closing Stock	=	(Average Stock ×2) – Opening Stock
	=	(Rs. 4,00,000 × 2) – Rs. 3,80,000 = Rs. 4,20,000
Quick Assets	=	Current Assets – Closing Stock
	=	Rs. 7,50,000 – Rs. 4,20,000 = Rs. 3,30,000

$$\dfrac{\text{Debt}}{\text{Equity (here Proprietary fund)}} = \dfrac{1}{1.5}, \text{ Or Proprietary fund} = 1.5 \text{ Debt.}$$

Total Asset	=	Proprietary Fund (Equity) + Debt
Or 17,50,000	=	1.5 Debt + Debt

Or Debt $= \dfrac{\text{Rs.} 17,50,000}{2.5} = \text{Rs.} 7,00,000$

Proprietary fund = 7,00,000 x 1.5 = Rs. 10,50,000

$$= \dfrac{17,50,000 \times 1.5}{2.5} = \text{Rs.} 10,50,000$$

5.   Profit after tax (PAT)   =   Total Assets × Return on Total Assets

                                           =   Rs. 17,50,000 × 15% = Rs. 2,62,500

     (i)   Calculation of Quick Ratio

$$\text{Quick Ratio} = \frac{\text{Quick Assets}}{\text{Current Liabilities}} = \frac{Rs.3,30,000}{Rs.3,00,000} = 1.1:1$$

     (ii)   Calculation of Fixed Assets Turnover Ratio

$$\text{Fixed Assets Turnover Ratio} = \frac{\text{Sales}}{\text{Fixed Assets}} = \frac{Rs.35,00,000}{Rs.10,00,000} = 3.5$$

     (iii)   Calculation of Proprietary Ratio

$$\text{Proprietary Ratio} = \frac{\text{Proprietary fund}}{\text{Total Assets}}$$

$$= \frac{\text{Rs.}10,50,000}{Rs.17,50,000} = 0.6:1$$

     (iv)   Calculation of Earnings per Equity Share (EPS)

$$\text{Earnings per Equity Share (EPS)} = \frac{\text{PAT - Preference Share Dividend}}{\text{Number of Equity Shares}}$$

$$= \frac{\text{Rs.}2,62,500 - \text{Rs.}18,000 \text{ (9\% of 2,00,000)}}{60,000}$$

$$= \text{Rs. 4.075 per share}$$

     (v)   Calculation of Price-Earnings Ratio (P/E Ratio)

$$\text{P/E Ratio} = \frac{\text{Market Price of Equity Share}}{\text{EPS}} = \frac{\text{Rs.}16}{Rs.4.075} = 3.926$$

(Sol-2)

Working Notes:

1.   Computation of Current Assets (CA) and Current Liabilities (CL)

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

$$\frac{\text{CA}}{\text{CL}} = \frac{1.5}{1}$$

$\therefore$ CA   = 1.5 CL

CA – CL   = Rs.1,50,000

1.5 CL-CL   = Rs.1,50,000

0.5 CL   = Rs.1,50,000

CL $= \dfrac{1,50,000}{0.5} = Rs.3,00,000$

CA   = 1.5 x 3,00,000 = Rs. 4,50,000

2.   Computation of Bank Credit (BC) and Other Current Liabilities (OCL)

$\dfrac{\text{Bank Credit}}{\text{Other CL}}$	=	$\dfrac{2}{1}$
BC	=	2 OCL
BC + OCL	=	CL
2 OCL + OCL	=	Rs. 3,00,000
3 OCL	=	Rs. 3,00,000
OCL	=	Rs. 1,00,000
Bank Credit	=	2 × 1,00,000 = Rs. 2,00,000

3.   Computation of Inventory

Quick Ratio	=	$\dfrac{\text{Quick Assets}}{\text{Current Liabilities}}$
	=	$\dfrac{\text{Current Assets - Inventories}}{\text{Current Liabilities}}$
0.8	=	$\dfrac{4,50,000 - \text{Inventories}}{\text{Rs.3,00,000}}$
0.8 × Rs. 3,00,000	=	Rs. 4,50,000 – Inventories
Inventories	=	Rs. 4,50,000 – Rs. 2,40,000 = Rs. 2,10,000

4.   Computation of Debtors

Inventory Turnover	=	5 times
Average Inventory	=	$\dfrac{\text{Cost of goods sold (COGS)}}{\text{Inventory Turnover}}$
COGS	=	Rs. 2,10,000 × 5 = Rs. 10,50,000

Average Collection Period (ACP) = 1.5 months = 45 days

Debtors Turnover	=	$\dfrac{360}{\text{ACP}} = \dfrac{360}{45} = 8$
Gross Margin	=	$\dfrac{\text{Sales - COGS}}{\text{Sales}} \times 100 = 25\%$
Sales-COGS	=	$\dfrac{25 \times \text{Sales}}{100}$
Sales – 0.25 Sales	=	COGS
0.75 Sales	=	Rs. 10,50,000
Sales	=	$\dfrac{\text{Rs.10,50,000}}{0.75} = Rs.14,00,000$
Debtors	=	$\dfrac{\text{Sales}}{\text{Debtors Turnover}}$
	=	$\dfrac{\text{Rs.14,00,000}}{8} = Rs.1,75,000$

5.   **Computation of Bank and Cash**

Bank & Cash   =   CA - (Debtors + Inventory)

=   Rs. 4,50,000 – (Rs. 1,75,000 + 2,10,000)

= Rs. 4,50,000 – 3,85,000 = Rs. 65,000

6.   Computation of Reserves & Surplus

$$\frac{\text{Reserves \& Surplus}}{\text{Bank \& Cash}}$$

Reserves & Surplus = 4 × Rs. 65,000 = Rs. 2,60,000

Balance Sheet of SONA Ltd. as on March 31, 2016

Liabilities	Rs.	Assets	Rs.
Share Capital	5,75,000	Fixed Assets	6,85,000
Reserves & Surplus	2,60,000	Current Assets:	
Current Liabilities:		Inventories	2,10,000
Bank Credit	2,00,000	Debtors	1,75,000
Other Current Liabilities	1,00,000	Bank & Cash	65,000
	11,35,000		**11,35,000**

(Sol-3)

Ratios for the year 2015-2016

(i)   (a)   Inventory turnover ratio

= $\dfrac{COGS}{\text{Average Inventory}} = \dfrac{20,860}{\dfrac{(2,867 + 2,407)}{2}} = 7.91$

(b)   Financial leverage

	2015-16	2014-15
$= \dfrac{\text{EBIT}}{\text{EBIT-I}}$	$= \dfrac{170}{5}$ $= 2.98$	$= \dfrac{586}{481}$ $= 1.22$

(c)   ROCE

= $\dfrac{\text{EBIT}\,(1\text{-}t)}{\text{Average Capital Employed}} = \dfrac{57(1-0.4)}{\left(\dfrac{5,947+4,535}{2}\right)} = \dfrac{34.2}{5251}$ X 100 = 0.651%

[Here Return on Capital Employed (ROCE) is calculated after Tax]

(d)   ROE

= $\dfrac{\text{Profits after tax}}{\text{Average shareholders' funds}} = \dfrac{34}{\dfrac{(2,377+1,472)}{2}} = \dfrac{34}{1,924.5} = 1.77\%$

(e)   Average Collection Period*

Average Sales per day = $\dfrac{22,165}{365}$ = 60.73 lakhs

Average collection period = $\dfrac{\text{Average Debtors}}{\text{Average sales per day}} = \dfrac{\dfrac{(1,495+1,168)}{2}}{60.73} = \dfrac{1331.5}{60.73}$ = 22 days

*Note: In the above solution, 1 year = 365 days has been assumed. Alternatively, it may be solved on the basis of 1 year = 360 days.

(ii)   Brief Comment on the financial position of JKL Ltd.

The profitability of operations of the company are showing sharp decline due to increase in operating expenses. The financial and operating leverages are becoming adverse. The liquidity of the company is under great stress.

Homework

(Sol-1)

Net worth   =   Capital + Reserves and surplus

              =   4,00,000 + 6,00,000 = Rs.10,00,000

              = $\dfrac{\text{Total Debt}}{\text{Networth}} = \dfrac{1}{2}$

∴ Total debt   =   Rs. 5,00,000

Total Liability side   =   Rs. 4,00,000 + Rs. 6,00,000 + Rs. 5,00,000

                         =   Rs. 15,00,000

                         =   Total Assets

Total Assets Turnover = $\dfrac{\text{Sales}}{\text{Total Assets}}$

        2   = $\dfrac{\text{Sales}}{\text{Rs.15,00,000}}$

∴ Sales   =   Rs.30,00,000

Gross Profit on Sales : 30% i.e. Rs. 9,00,000

∴ Cost of Goods Sold (COGS)   = Rs. 30,00,000 – Rs. 9,00,000

                                = Rs. 21,00,000

Inventory turnover = $\dfrac{\text{COGS}}{\text{Inventory}}$

        3   = $\dfrac{\text{Rs.21,00,000}}{\text{Inventory}}$

∴ Inventory =   Rs. 7,00,000

Average collection period $=$ $\dfrac{\text{Aerage Debtors}}{\text{Sales/Day}}$

40 $=$ $\dfrac{\text{Debtors}}{\text{Rs.}30,00,000/360}$

$\therefore$ Debtors $=$ Rs. 3,33,333.

Acid test ratio $=$ $\dfrac{\text{Current Assets - Stock (Quick Asset)}}{\text{Current liabilities}}$

0.75 $=$ $\dfrac{\text{Current Assets - }7,00,000}{\text{Rs.}5,00,000}$

$\therefore$ Current Assets $=$ Rs.10,75,000.

$\therefore$ Fixed Assets $=$ Total Assets – Current Assets

$=$ Rs. 15,00,000 – Rs. 10,75,000 = Rs. 4,25,000

Cash and Bank balance = Current Assets – Inventory – Debtors

= Rs. 10,75,000 – Rs. 7,00,000 – Rs. 3,33,333 = Rs. 41,667.

Balance Sheet as on March 31, 2016

Liabilities	Rs.	Assets	Rs.
Equity Share Capital	4,00,000	Plant and Machinery and other Fixed Assets	4,25,000
Reserves & Surplus	6,00,000	Current Assets:	
Total Debt : Current Liabilities	5,00,000	Inventory	7,00,000
		Debtors	3,33,333
		Cash	41,667
	15,00,000		**15,00,000**

(Sol-2)

Gross Profit   Rs. 54,000

Gross Profit Margin   20%

$\therefore$ Sales $=$ $\dfrac{\text{Gross Profit}}{\text{Gross Profit Margin}}$ Rs.54,000 / 0.20 = Rs.2,70,000

Credit Sales to Total Sales $=$ 80%

$\therefore$ Credit Sales $=$ Rs. 2,70,000×0.80 = Rs. 2,16,000

Total Assets Turnover $=$ 0.3 times

$\therefore$ Total Assets $=$ $\dfrac{\text{Sales}}{\text{Total Assets Turnover}}$

$=$ $\dfrac{\text{Rs.}2,70,000}{0.3}$ = Rs. 9,00,000

Sales – Gross Profit	=	COGS
∴ COGS	=	Rs. 2, 70,000 – 54,000 = Rs. 2, 16,000
Inventory turnover	=	4 times

$$\text{Inventory} = \frac{\text{COGS}}{\text{Inventory turnover}} = \frac{2,16,000}{4} = \text{Rs.}54,000$$

Average Collection Period	=	20 days

$$\therefore \text{Debtors turnover} = \frac{360}{\text{Average Collection Period}} = 360/20 = 18$$

$$\therefore \text{Debtors} = \frac{\text{Credit Sales}}{\text{Debtors turnover}} = \frac{Rs.2,16,000}{18} = Rs.12,000$$

Current ratio	=	1.8

$$1.8 = \frac{\text{Debtors + Inventory + Cash}}{\text{Creditors}}$$

1.8 Creditors	=	(Rs. 12,000 + Rs. 54,000 + Cash)
1.8 Creditors	=	Rs. 66,000 + Cash .... (i)
Long-term Debt to Equity	=	40%
Shareholders' Funds	=	Rs. 6, 00,000
∴ Long-term Debt	=	Rs. 6, 00,000 × 40% = Rs. 2, 40,000
Creditors (Balance figure)	=	9, 00,000 – (6, 00,000 + 2, 40,000) = Rs. 60,000

∴ Cash = (60,000×1.8) – 66,000 = Rs. 42,000   [From equation (i)]

Balance Sheet

Liabilities	Rs.	Assets	Rs.
Creditors (Bal. Fig)	60,000	Cash	42,000
		Debtors	12,000
Long- term debt	2,40,000	Inventory	54,000
Shareholders' funds	6,00,000	Fixed Assets (Bal fig.)	7,92,000
	9,00,000		**9,00,000**

(Sol-3)

(i) **Computation of Average Inventory**

Gross Profit	= 25% of Rs. 30, 00,000	= Rs. 7,50,000
Cost of goods sold (COGS)	= Sales - Gross Profit	= Rs. 30,00,000 – Rs. 7,50,000
		= Rs. 22,50,000

$$\text{Inventory Turnover Ratio} = \frac{COGS}{\text{Average Inventory}}$$

$$6 = \frac{Rs.22,50,000}{\text{Average Inventory}}$$

Average inventory   = Rs. 3,75,000

(ii) **Computation of Purchases**

Purchases   = COGS + (Closing Stock – Opening Stock) = Rs. 22,50,000 + 80,000*

Purchases   = Rs. 23,30,000

* Increase in Stock = Closing Stock – Opening Stock = Rs. 80,000

(iii) **Computation of Average Debtors**

Let Credit Sales be Rs. 100, Cash sales = $\frac{25}{100}$ x 100 = Rs. 25

Total Sales = 100 + 25= Rs. 125

Total sales is Rs. 125 credit sales is Rs. 100

If total sales is Rs. 30,00,000, then credit sales is = $\frac{Rs.30,00,000 \ x \ 100}{125}$

Credit Sales = Rs. 24,00,000

Cash Sales = (Rs. 30,00,000 – Rs. 24,00,000) = Rs. 6,00,000

Debtors Turnover Ratio = $\frac{Net \ Credit \ Sales}{Average \ debtors} = 8 = \frac{Rs.24,00,000}{\text{Average debtors}} = 8$

Average Debtors = $\frac{Rs.24,00,000}{8}$

Average Debtors = Rs. 3,00,000

(iv) **Computation of Average Creditors**

Credit Purchases	= Purchases – Cash Purchases
	= Rs. 23,30,000 – Rs. 2,30,000 = Rs. 21,00,000

$$\text{Creditors Turnover Ratio} = \frac{\text{Credit Purchases}}{\text{Average Creditors}}$$

$$10 = \frac{21,00,000}{\text{Average Creditors}}$$

Average Creditors   = Rs. 2,10,000

(v)   **Computation of Average Payment Period**

$$\text{Average Payment Period} = \frac{\text{Average Creditors}}{\text{Average Daily Credit Purchases}}$$

$$= \frac{\text{Rs.2,10,000}}{\left(\dfrac{\text{Credit Purchases}}{365}\right)} = \frac{\text{Rs.2,10,000}}{\left(\dfrac{\text{Rs.21,00,000}}{365}\right)}$$

$$= \frac{\text{Rs.2,10,000}}{Rs.21,00,000} \times 365^* = 36.5 \text{ days}$$

Alternatively

Average Payment Period   =   365/Creditors Turnover Ratio

$$= \frac{365^*}{10} = 36.5 \text{ days}$$

(vi)   **Computation of Average Collection Period**

Average Collection Period =

$$= \frac{Average\ Debtors}{Net\ Credit\ Sales} \times 365^* = \frac{Rs.3,00,000}{Rs.24,00,000} \times 365 = 45.625 \text{ days} \times 365^*$$

Alternatively

Average collection period   = $\dfrac{365^*}{\text{Debtors Turnover Ratio}}$

$$= \frac{365}{8} = 45.625 \text{ days}$$

    * 1 year is taken as 365 days.

(vii)   **Computation of Current Assets**

Current Ratio   = $\dfrac{\text{Current Assets (CA)}}{\text{Current Liabilities (CL)}} = 2.4\ 2.4$

2.4 Current Liabilities   = Current Assets or CL = CA/2.4

Further, Working capital   = Current Assets – Current liabilities

So, Rs. 2,80,000 = CA-CA/2.4

Rs. 2,80,000 = 1.4 CA/2.4 Or, 1.4 CA = Rs. 16,72,000

CA = Rs. 4,80,000

(viii)   **Computation of Current Liabilities**

Current liabilities = $\dfrac{4,80,000}{2.4}$ = Rs.2,00,000

(Sol-4)

(a)   Inventory turnover = $\dfrac{\text{Cost of goods sold}}{\text{Average inventory}}$

Since gross profit margin is 15 percent, the cost of goods sold should be 85 percent of the sales.

Cost of goods sold = 0.85 x Rs.6,40,000 = Rs.5,44,000.

Thus, = $\dfrac{Rs.5,44,000}{\text{Average inventory}} = 5$

Average inventory = $\dfrac{\text{Rs.5,44,000}}{5} = Rs.1,08,800$

(b)   Average collection period = $\dfrac{\text{Average Receivables}}{\text{Credit Sales}}$ x 360 days

Average Receivables = $\dfrac{(\text{Opening Receivables+ Closing Receivables})}{2}$

Closing balance of receivables is found as follows:

	Rs.	Rs.
Current assets (2.5 of current liabilities)		2,40,000
Less: Inventories	48,000	
Cash	16,000	64,000
∴ Receivables		1,76,000

Average Receivables = $\dfrac{(Rs.1,76,000 + Rs.80,000)}{2}$

= Rs. 2,56,000 ÷2 = Rs. 1,28,000

Average collection period = $\dfrac{Rs.1,28,000}{Rs.6,40,000}$ x 360 = 72 days

(Sol-5)

$\dfrac{\text{Long term debt}}{\text{Net Worth}} = 0.5 = \dfrac{\text{Long term debt}}{2,00,000}$

Long term debt = Rs.1,00,000

Total liabilities and net worth = Rs.4,00,000

Total assets = Rs.4,00,000

$\dfrac{\text{Sales}}{\text{Total Assets}} = 2.5 = \dfrac{\text{Sales}}{4,00,000} = \text{Sales} = Rs.10,00,000$

Cost of goods sold = (0.9) (Rs.10,00,000) = Rs.9,00,000

$\dfrac{\text{Cost of goods sold}}{\text{Inventory}} = \dfrac{9,00,000}{\text{Inventory}} = 9 = \text{Inventory} = Rs.1,00,000$

$$\frac{\text{Receivables x 360}}{10,00,000} = 18 \text{ days}$$

Receivables = Rs.50,000

$$\frac{\text{Cash} + 50,000}{1,00,000} = 1$$

Cash= Rs.50,000

Plant and equipment = Rs. 2,00,000.

Balance Sheet

	Rs.		**Rs.**
Cash	50,000	Notes and payables	1,00,000
Accounts receivable	50,000	Long-term debt	1,00,000
Inventory	1,00,000	Common stock	1,00,000
Plant and equipment	2,00,000	Retained earnings	1,00,000
Total assets	4,00,000	Total liabilities and equity	4,00,000

LEVERAGE

TO BE DISCUSSED ONLY IN CLASSROOM

(Sol-1)

Profit Volume Ratio $= \dfrac{\text{Contribution}}{\text{Sales}} \times 100$

So, $25.55 = \dfrac{\text{Contribution}}{\text{Rs.42,00,000}} \times 100$ Or, Contribution $= 42,00,000 \times 25.55$

Contribution $= \text{Rs.10,73,100}$

Income Statement

Particulars	(Rs.)
Sales	42,00,000
Variable Cost (Sales - Contribution)	31,26,900
Contribution	10,73,100
Fixed Cost	3,48,000
EBIT	7,25,000
Interest	2,03,500
EBT(EBIT – Interest)	5,21,600
Tax	1,82,500
Profit after Tax (EBT – Tax)	3,39,040

(i) Operating Leverage $= \dfrac{\text{Contribution}}{\text{Earnings before interest and tax}\,(\text{EBIT})}$

Or, $\dfrac{\text{Contribution}}{\text{Contribution-Fixed Cost}} = \dfrac{\text{Rs.10,73,100}}{\text{Rs.10,73,100 - Rs.3,48,000}}$

$= \dfrac{\text{Rs.10,73,100}}{\text{Rs.7,25,100}} = 1.48$

(ii) Combined Leverage $=$ Operating Leverage x Financial Leverage

$= 1.48 \times 1.39 = 2.06$

Or, $\dfrac{\text{Contribution}}{\text{EBT}}$ i.e. $\dfrac{\text{Rs.10,73,100}}{\text{Rs.5,21,600}} = 2.06$

(iii) Earnings per Share (EPS)

EPS $= \dfrac{\text{PAT}}{\text{No. of Share}} = \dfrac{\text{Rs.3,39,040}}{\text{Rs.2,50,000}} = 1.3561$

EPS $= 1.36$

(Sol-2)

Operating Leverage:	Situation-I (Rs.)	Situation-II (Rs.)
Sales (S) 3000 units @ Rs. 30/- per unit	90,000	90,000
Less: Variable Cost (VC) @ Rs. 15 per unit	45,000	45,000
Contribution (C)	45,000	45,000
Less: Fixed Cost (FC)	15,000	20,000
Operating Profit (OP) (EBIT)	30,000	25,000

(i)   Operating Leverage

$$\frac{C}{OP} \quad = \quad Rs.\frac{45,000}{30,000} \qquad Rs.\frac{45,000}{25,000}$$

$$= \quad 1.5 \qquad\qquad 1.8$$

(ii)   Financial Leverages

	A (Rs.)	B (Rs.)
Situation I		
Operating Profit (EBIT)	30,000	30,000
Less: Interest on debt	2,000	1,000
PBT	28,000	29,000

Financial Leverage = $\dfrac{OP}{PBT}$ =Rs.$\dfrac{30,000}{28,000}$=1.07   Rs.$\dfrac{30,000}{24,000}$=1.04

	A (Rs.)	B (Rs.)
Situation-II		
Operating Profit (OP) (EBIT)	25,000	25,000
Less: Interest on debt	2,000	1,000
PBT	23,000	24,000

Financial Leverage = $\dfrac{OP}{PBT}$ =Rs.$\dfrac{25,000}{23,000}$=1.09   Rs.$\dfrac{25,000}{24,000}$=1.04

(iii)   Combined Leverages

	A (Rs.)	B (Rs.)
(a) Situation I	1.5 x 1.07 =1.61	1.5 x 1.04 = 1.56
(b) Situation II	1.8 x 1.09 =1.96	1.8 x 1.04 =1.87

Homework

(Sol-1)

Calculation of Leverages

Particulars	(Rs.)
Sales	60,00,000
Less: Variable Cost $\left(\text{Sales x } \dfrac{100}{150} \right)$	40,00,000
Contribution	20,00,000
Less: Fixed Cost	5,00,000
EBIT	15,00,000
Less: Interest on Debentures	3,30,000
EBT	11,70,000

Operating Leverage = $\dfrac{\text{Contribution}}{\text{EBIT}} = \dfrac{\text{Rs.20,00,000}}{\text{Rs.15,00,000}} = 1.3333$

Financial Leverage = $\dfrac{\text{EBIT}}{\text{EBT}} = \dfrac{\text{Rs.15,00,000}}{\text{Rs.11,70,000}} = 1.2821$

Combined Leverage = OL × FL or $\dfrac{\text{Contribution}}{\text{EBT}}$

= 1.3333 × 1.2821 or $\dfrac{\text{Rs.20,00,000}}{\text{Rs.11,70,000}} = 1.7094$

(Sol-2)

Income Statements of Company A and Company B

	Company A (Rs.)	Company B (Rs.)
Sales	91,000	1,05,000
Less: Variable cost	56,000	63,000
Contribution	35,000	42,000
Less: Fixed Cost	20,000	31,500
Earnings before interest and tax (EBIT)	15,000	10,500
Less: Interest	12,000	9,000
Earnings before tax (EBT)	3,000	1,500
Less: Tax @ 30%	900	450
Earnings after tax (EAT)	2,100	1,050

Working Notes:

Company A

(i) Financial Leverage $= \dfrac{\text{EBIT}}{\textit{EBT} \text{ i.e. EBIT - Interest}}$

So, 5 $= \dfrac{\text{EBIT}}{\text{EBIT-12,000}}$

Or, 5 (EBIT – 12,000) = EBIT

Or, 4 EBIT = 60,000

Or, EBIT = Rs.15,000

(ii) Contribution = EBIT + Fixed Cost

= Rs. 15,000 + Rs. 20,000 = Rs. 35,000

(iii) Sales = Contribution + Variable cost

= Rs. 35,000 + Rs. 56,000

= Rs. 91,000

Company B

(i) Contribution = 40% of Sales (as Variable Cost is 60% of Sales)

= 40% of 1,05,000 = Rs. 42,000

(ii) Operating Leverage $= \dfrac{\text{Contribution}}{\text{EBIT}}$ Or, $4 = \dfrac{\text{Rs.42,000}}{\text{EBIT}}$

EBIT $= \dfrac{\text{Rs.42,000}}{4} = \text{Rs.10,500}$

(iii) Fixed Cost = Contribution – EBIT = 42,000 – 10,500 = Rs. 31,500

(Sol-3)

Estimation of Degree of Operating Leverage (DOL), Degree of Financial Leverage (DFL) and Degree of Combined Leverage (DCL)

	P	Q	R
Output (in units)	2,50,000	1,25,000	7,50,000
	Rs.	Rs.	Rs.
Selling Price (per unit)	7.50	7	10
Sales Revenues (Output × Selling Price)	18,75,000	8,75,000	75,00,000
Less: Variable Cost (Output × Variable Cost)	12,50,000	2,50,000	56,25,000
Contribution Margin	6,25,000	6,25,000	18,75,000
Less: Fixed Cost	5,00,000	2,50,000	10,00,000
Earnings before Interest and Tax	1,25,000	3,75,000	8,75,000

(EBIT)			
Less : Interest Expense	75,000	25,000	-
Earnings before Tax (EBT)	50,000	3,50,000	8,75,000
$DOL = \dfrac{\text{Contribution}}{EBIT}$	5	1.67	2.14
$DFL = \dfrac{\text{EBIT}}{EBT}$	2.5	1.07	1.00
DCL= DOL x DFL	12.5	1.79	2.14
Comment	Aggressive Policy	Moderate Policy	Moderate Policy with no financial leverage

(Sol-4)

Sales in units	60,000 (Rs.)	50,000 (Rs.)
Sales Value	7,30,000	6,00,000
Variable Cost	(4,80,000)	(4,00,000)
Contribution	2,40,000	2,00,000
Fixed expenses	(1,00,000)	(1,00,000)
EBIT	1,40,000	1,00,000
Debenture Interest	(50,000)	(50,000)
EBT	90,000	50,000
Tax @ 30%	(27,000)	(15,000)
Profit after tax (PAT)	63,000	35,000

(i) Earnings per share (EPS) = $\dfrac{63,000}{5,000} = Rs.12.6$ $\dfrac{35,000}{5,000} = Rs.7$

Decrease in EPS = 12.6 – 7 = 5.6

% decrease in EPS = $\dfrac{5.6}{12.6}$ x 100 = 44.44%

(ii) Operating leverage = $\dfrac{\text{Contribution}}{\text{EBIT}} = \dfrac{Rs.2,40,000}{Rs.1,40,000}$ $\dfrac{Rs.2,00,000}{Rs.1,00,000}$

  = 1.71   2

(iii) Financial Leverage = $\dfrac{\text{EBIT}}{\text{EBT}} = \dfrac{Rs.1,40,000}{Rs.90,000}$ $\dfrac{Rs.1,00,000}{Rs.50,000}$

  = 1.56   2

(Sol-5)

Calculation of Operating and Financial Leverage

	(Rs.)
Sales	40,00,000
Less: Variable cost	25,00,000
Contribution (C)	15,00,000
Less: Fixed cost	6,00,000
EBIT	9,00,000
Less: Interest	3,00,000
EBT	6,00,000

$$\text{Operating leverage} = \frac{C}{EBIT} = \frac{Rs.15,00,000}{Rs.9,00,000} = 1.67$$

$$\text{Financial leverage} = \frac{EBIT}{EBT} = \frac{Rs.9,00,000}{Rs.6,00,000} = 1.50$$

(Sol-6)

Workings:

(i) Financial Leverage $= \dfrac{EBIT}{EBIT - Interest}$ Or, $2 = \Sigma \dfrac{EBIT}{EBIT - Rs.2,000}$

Or,   EBIT = R.4,000

(ii) Operating Leverage $= \dfrac{Contribution}{EBIT}$ Or, $3 = \dfrac{Contribution}{Rs.4,000}$

Or, Contribution = Rs. 12,000

(iii) Sales $= \dfrac{Contribution}{P/VRatio} = \dfrac{Rs.12,000}{25\%} = Rs.48,000$

(iv) Fixed Cost   = Contribution – Fixed cost = EBIT

= Rs.12,000 – Fixed cost = Rs.4,000 Or, Fixed cost = Rs. 8,000

Income Statement for the year ended 31st December 2014

Particulars	**Amount (Rs.)**
Sales	48,000
Less: Variable Cost (75% of Rs. 48,000)	(36,000)
Contribution	12,000
Less: Fixed Cost (Contribution - EBIT)	(8,000)
Earnings Before Interest and Tax (EBIT)	4,000
Less: Interest	(2,000)
Earnings Before Tax (EBT)	2,000
Less: Income Tax @ 30%	(600)
Earnings After Tax (EAT or PAT)	1,400

CAPITAL STRUCTURE
To be discussed only in classroom

(Sol-1)

Sources of Capital	Plan I	Plan II	Plan III	Plan IV
Present Equity Shares	1,00,000	1,00,000	1,00,000	1,00,000
New Issue	60,000	40,000	30,000	30,000
Equity share capital (Rs.)	16,00,000	14,00,000	13,00,000	13,00,000
No. of Equity shares	1,60,000	1,40,000	1,30,000	1,30,000
12% Long term loan (Rs.)	-	2,00,000	-	-
9% Debentures (Rs.)	-	-	3,00,000	-
6% Preference Shares (Rs.)	-	-	-	3,00,000

Computation of EPS and Financial Leverage

Sources of Capital	Plan I	Plan II	Plan III	Plan IV
EBIT (Rs.)	4,00,000	4,00,000	4,00,000	4,00,000
Interest on 12% Loan (Rs.)	-	24,000	-	-
Interest on 9% debentures (Rs.)	-	-	27,000	-
EBT (Rs.)	4,00,000	3,76,000	3,73,000	4,00,000
Less : Tax@ 40%	1,60,000	1,50,400	1,49,200	1,60,000
EAT (Rs.)	2,40,000	2,25,600	2,23,800	2,40,000
Less: Preference Dividends (Rs.)	-	-	-	18,000
(a)Net Earnings available for equity shares (Rs.)	2,40,000	2,25,600	2,23,800	2,22,000
(b) No. of equity shares	1,60,000	1,40,000	1,30,000	1,30,000
(c) EPS (a ÷ b) Rs.	1.50	1.61	1.72	1.71
Financial leverage- $\left(\dfrac{EBIT}{EBIT\text{-}I}\right) or \left(\dfrac{EBIT}{EBT^*}\right)$	1.00	1.06	1.07	1.08

* EBT is Earnings before tax but after interest and preference dividend in case of Plan IV.

Comments: Since the EPS and financial leverage both are highest in plan III, the management could accept it.

(Sol-2)

(i)   **Calculation of Leverages and Earnings per Share (EPS)**

Income Statement

Particulars	(Rs.)
Sales Revenue	90,00,000
Less: Variable Cost @ 60%	54,00,000
Contribution	36,00,000
Less: Fixed Cost other than Interest	10,00,000
Earnings before Interest and Tax (EBIT)	26,00,000
Less: Interest (12% on Rs. 40,00,000)	4,80,000
Earnings before tax (EBT)	21,20,000
Less: Tax @ 30%	6,36,000
Earnings after tax (EAT)/ Profit after tax (PAT)	14,84,000

1.   **Calculation of Operating Leverage (OL)**

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{\text{Rs.36,00,000}}{26,00,000} = 1.3846$$

2.   **Calculation of Financial Leverage (FL)**

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{\text{Rs.26,00,000}}{\text{Rs.21,20,000}} = 1.2264$$

3.   **Calculation of Combined Leverage (CL)**

Combined Leverage = OL × FL = 1.3846 × 1.2264 = 1.6981

$$\text{Or,} \quad \frac{\text{Contribution}}{\text{EBT}} = \frac{\text{Rs.36,00,000}}{\text{Rs.21,20,000}} = 1.6981$$

4.   **Calculation of Earnings per Share (EPS)**

$$\text{EPS} = \frac{\text{EAT/PAT}}{\text{Number of Equity Shares}} = \frac{\text{Rs.14,84,000}}{4,00,000} = 3.71$$

(ii)   **Calculation of likely levels of EBIT at Different EPS**

$$\text{EPS} = \frac{(\text{EBIT-I})(1\text{-T})}{\text{Number of Equity Shares}}$$

    (1)   If EPS is Rs. 4

$$= \frac{(\text{EBIT-4,80,000})(1\text{-0.3})}{4,00,000} \quad \text{Or, EBIT - Rs.4,80,000} = \frac{\text{Rs.16,00,000}}{0.70}$$

EBIT – Rs. 4,80,000 = Rs. 22,85,714 Or, EBIT = Rs. 27, 65,714

(2)   If EPS is Rs. 2

$$2 = \frac{(EBIT-Rs.4,80,000)(1-0.3)}{Rs.4,00,000} \text{ Or, EBIT - Rs.4,80,000} = \frac{Rs.8,00,000}{0.70}$$

EBIT – Rs. 4,80,000 = Rs. 11,42,857 Or, EBIT = Rs. 16, 22,857

(3)   If EPS is Rs. Zero

$$0 = \frac{(EBIT-Rs.4,80,000)(1-0.3)}{Rs.4,00,000} \text{ Or, EBIT = Rs.4,80,000}$$

(Sol-3)

16000000

P-1

15% Deb.

16000000

P-2

ESC 16000000

(1000000 x 16)

Expected EBIT   = (250 x 0.10) + (450 x 0.30) + (540 x 0.50) + (630 x 0.10)

         = 493 (lakh)

	P-1	**P-2**
EBIT	493	493
(-) Interest	(74)	50)
EBT	419	443
(-) Tax	(216.83)	(229.25)
PAT	202.17	213.75
(-) PD	-	-
Profit for ESH	202.17	213.75
÷ No. of equity shares	50	60
EPS	4.04	3.56

Homework

(Sol-1)

2,00,000

Plan-1

15% deb. 1,00,000

ESC 1,00,000

(1,000 x 100)

Plan-2

ESC 2,00,000

(2,000 x 100)

(1)   IDP = $\dfrac{(x-I)(1-t)-PD}{n}$

Plan-1 = Plan-2

$\dfrac{(x-15000)0.65}{1000} = \dfrac{(x)0.65}{2000}$

$0.65\,x - 9750 = \dfrac{0.65x}{2}$

$1.3\,x - 19500 = 0.165x$

x = 30000

Verification :

Plan-1 = $\dfrac{(30000-15000)0.65}{1000} = 9.75$

Plan-2 = $\dfrac{(30000)0.65}{2000} = 9.75$

(2)

	Plan-1 (u=100000)	**Plan-1 (u = 100000)**
Sales @ 2	2,00,000	2,00,000
(-) V.C. @ 1	(1,00,000)	(1,00,000)
C	1,00,000	1,00,000
(-) F.C.	(50,000)	(50,000)
EBIT	50,000	50,000
(-) Int.	(15,000)	-
EBT	35000	50,000
(-) Tax	(12,250)	(17,500)
	22,750	32,500
	-	-
	22,750	32,500
	1000	2000
	22.75	16.25

(3)   DCL = $\dfrac{C}{EBIT} = \dfrac{10,000}{35,000} = 2.8571$

Now, DCL = $\dfrac{\%\Delta \text{ in EPS}}{\%\Delta \text{ in sales}} = 2.8571$

$\therefore$ DCL = $\dfrac{\%\Delta \text{ in EPS}}{+20\%} = 2.8571$

% Δ in EPS = 57.1429%

$\therefore$ New EPS

= 22.75 + 57.1429%

= 35.75

(Sol-2)

The capital investment can be financed in two ways i.e.

(i)   By issuing equity shares only worth Rs.4.5 crore or

(ii)   By raising capital through taking a term loan of Rs. 3 crores and Rs. 1.50 crores through issuing equity shares (as the company has to comply with the 2 : 1 Debt Equity ratio insisted by financing agencies).

In first option interest will be Zero and in second option the interest will be Rs. 36,00,000

Point of Indifference between the above two alternatives =

$$\frac{EBIT_1 \times (1\text{-}t)}{\text{No. of equity shares } (N_1)} = \frac{(EBIT_2 \text{ -Interest}) \times (1\text{-}t)}{\text{No. of equity shares } (N_2)}$$

Or, $$\frac{EBIT\,(1-0.50)}{45,00,000 \text{ shares}} = \frac{(EBIT\text{-Rs.36,00,000}) \times (1\text{-}0.50)}{15,00,000 \text{ shares}}$$

Or, 0.5 EBIT   =   1.5 EBIT – Rs. 54,00,000

EBIT   =   Rs. 54,00,000

EBIT at point of Indifference will be Rs. 54 Lakhs.

(The face value of the equity shares is assumed as Rs.10 per share. However, indifference point will be same irrespective of face value per share).

(Sol-3)

Computation of Rate of Preference Dividend

$$\frac{(EBIT\text{-Interest})(1\text{-}t)}{\text{No. of Equity Shares } (N_1)} = \frac{EBIT(1\text{-}t) \text{ - Preference Dividend}}{\text{No. of Equity Shares } (N_2)}$$

$$\frac{(Rs.2,40,000\text{-Rs.24,000})(1\text{-}0.30)}{40,000 \text{ shares}} = \frac{Rs.2,40,000\,(1-0.30) - \text{ Preference Dividend}}{40,000 \text{ shares}}$$

$$\frac{Rs.2,16,000(1\text{-}0.30)}{40,000 \text{ shares}} = \frac{Rs.1,68,000 \text{ - Preference Dividend}}{40,000 \text{ shares}}$$

Rs. 1,51,200 = Rs. 1,68,000 – Preference Dividend

Preference Dividend = Rs. 1,68,000 – Rs. 1,51,200 = Rs. 16,800

Rate of Dividend = $\dfrac{\text{Preference Dividend}}{\text{Preference share capital}}$ x 100 = $\dfrac{Rs.16,800}{Rs.2,00,000}$ x 100 = 8.4%

COST OF CAPITAL

To be discussed only in classroom

(Sol-1)

Calculation of Weighted Average Cost of Capital (WACC)

Source	Amount (Rs.)	Weight	Cost of Capital after tax	WACC
Equity Capital	65,00,000	0.619	0.163	0.1009
12% Preference Capital	12,00,000	0.114	0.120	0.0137
15% Redeemable Debentures	20,00,000	0.190	0.105*	0.020
10% Convertible Debentures	8,00,000	0.076	0.07**	0.0053
Total	1,05,00,000	1.0000		0.1399

* Cost of Debentures (after tax) = 15 (1 – 0.30) = 10.5% = 0.105

** Cost of Debentures (after tax) = 10 (1 – 0.30) = 7% = 0.07

Weighted Average Cost of Capital = 0.1399 = 13.99%

(Note: In the above solution, the Cost of Debentures has been computed in the above manner without considering the impact of special

(Sol-2)

WACC

B/U

ESC	45,000	45	14%	6.30
Res	15,000	15	14%	2.10
PSC	10,000	10	10%	1
Deb.	30000	30	5%	1.50
	100000	100		10.9%

M/U				
ESC	67,500	48.21	14%	6.75
Res.	22,500	16.07	14%	2.25
PSC	15,000	10.72	10%	1.078
Deb.	35,000	25	5%	1.25
	1,40,000	100		10.84%

(Sol-3)

(a)   **The cost of Equity Capital is :**

$$k_e = \frac{D_1}{P_0} + g = \frac{Rs.2}{Rs.20} + .07 = 0.1 + .07 = .17 \text{ or } 17\%.$$

The cost of 8% debentures, after tax is 8 (1-3.3) = 5.6%

STATEMENT SHOWING WEIGHTED COST OF CAPITAL

	Existing Amount	After tax Cost	Weights	Weighted Cost
Equity share capital	Rs.40,00,000	.170	.500	.0850
Preference share capital	10,00,000	.060	.125	.0075
Debentures	30,00,000	.056	.375	.0210
				.1135

So, Weighted Average cost of capital (k_0) is 11.35%.

$$k_e = \frac{D_1}{P_0} + g = \frac{Rs.3}{Rs.15} + .07 = .20 + .07 = .27 \text{ or } 27\%$$

The cost of capital of new debenture (after tax) is 10% (1-.3) = 7%.

STATEMENT SHOWING WEIGHTED AVERAGE COST OF CAPITAL

	Amount	After tax Cost	Weights	Weighted Cost
Equity share capital	Rs.40,00,000	.270	.40	.108
6% Preference Share Capital	10,00,000	.060	.10	.006
8% Debentures	30,00,000	.056	.30	.017
10% Debentures	20,00,000	.070	.20	.014
				.145

So, Weighted Average Cost of Capital (K_0) 14.50%

$$k_e = \frac{D_1}{P_0} + g = \frac{Rs.3}{Rs.15} + .10 = .20 + .10 = .30 \text{ or } 30\%$$

STATEMENT SHOWING WEIGHTED AVERAGE COST OF CAPITAL

	Amount	After tax Cost	Weights	Weighted Cost
Equity share capital	Rs.40,00,000	.300	.40	.120
6% Preference Share Capital	10,00,000	.060	.10	.006
8% Debentures	30,00,000	.056	.30	.017
10% Debentures	20,00,000	.070	.20	.014
				.157

So, Weighted Average cost of capital (K_0) 15.70%

(Sol-4)

Traditional Approach

	0%	30%	50%
		10% D= 600000	12% D = 100000
EBIT (-) Int.	3,00,000 -	3,00,000 (60,000)	3,00,000 (1,20,000)
NI	3,00,000	2,40,000	1,80,000
Value of firm V = D + E Debt	- 	6,00,000	1,00,000
$Eq = \dfrac{NI}{Ke}$	18,75,000 (300000 / 15%)	14,11,765 (24,00,000/17%)	9,00,000 (8000
V	18,75,000	20,11,765	19,00,000
$Ko = \dfrac{EBIT}{V}$	16%	14.91%	15.79%

Homework

(Sol-1)

Workings:

(i)   Cost of Equity $(K_e) = \dfrac{D_1}{P_0} + g = \dfrac{Rs.3}{Rs.30} + 0.07 = 0.1 + 0.07$ $= 0.17 = 17\%$

(ii)   Cost of Debentures (Kd) = I (1 - t) = 0.09 (1 - 0.4) = 0.054 or 5.4%

Computation of Weighted Average Cost of Capital (WACC using market value weights)

Source of capital	Market Value of capital (Rs.)	Weight	Cost of capital (%)	WACC (%)
9% Debentures	30,00,000	0.30	5.40	1.62
12% Preference Shares	10,00,000	0.10	12.00	1.20
Equity Share Capital (Rs.30 × 2,00,000 shares)	60,00,000	0.60	17.00	10.20
Total	**1,00,00,000**	**1.00**		**13.02**

(Sol-2)

$$KP = \frac{PD + \left[\dfrac{RV - SU}{n}\right]}{\left[\dfrac{RV + SV}{2}\right]} \times 100$$

$$= \frac{12 + \left[\dfrac{110 - 103}{10}\right]}{\left[\dfrac{110 + 103}{2}\right]} \times 100$$

= 11.92%

(Sol-3)

Working Notes:

Determination of Cost of capital:

(i)   Cost of Debentures (K_d)

$$K_d = \frac{I(1\text{-}t) + \dfrac{RV\text{-}NP}{n}}{\dfrac{RV + NP}{2}}$$

Where,

I = Annual Interest Payment

NP = Net proceeds of debentures net of flotation costs

RV = Redemption value of debentures

t = Income tax rate

n = Life of debentures

$$K_d = \frac{Rs.8(1\text{-}0.5) + \dfrac{Rs.100\text{-}Rs.96^*}{20 \text{ years}}}{\dfrac{Rs.100 + Rs.96^*}{2}} = \frac{Rs.4.20}{Rs.98} = 0.0429 \text{ or } 4.29\%$$

* Net Proceeds   = Par value per shares - 4% Flotation cost per share

                        = Rs.100 – 4% of Rs.100 = Rs.96

(ii)   Cost of Preference Shares (K_p)

$$K_p = \frac{PD + \dfrac{RV\text{-}NP}{n}}{\dfrac{RV + NP}{2}}$$

Where,

PD = Preference Dividend per share

NP = Net proceeds of share net of flotation costs

RV = Redemption value of shares

n = Life of preference shares

$$K_p = \frac{Rs.10 + \dfrac{Rs.100 - Rs.95^*}{15 \text{ years}}}{\dfrac{Rs.100 + Rs.95^*}{2}} = \frac{Rs.10.33}{Rs.97.5} = 0.106 \text{ or } 10.60\%$$

* Net Proceeds   = Par value per shares - 5% Flotation cost per share

                           = Rs.100 – 5% of Rs.100 = Rs.95

(iii)   Cost of Equity (K_e)

$$K_e = \frac{\text{Expected Dividend } (D_1)}{\text{Current market price } (P_0)} + \text{Growth rate } (g) = \frac{Rs.2}{Rs.22 - Rs.2} + 0.05 = 0.15 \text{ or } 15\%$$

(i)   Computation of Weighted Average Cost of Capital based on Book Value Weights

Source of Capital	Book Value (Rs.)	Weights to Total Capital	After tax Cost of capital (%)	WACC (%)
Debentures	8,00,000	0.40	4.29	1.716
Preference Shares	2,00,000	0.10	10.60	1.060
Equity Shares	10,00,000	0.50	15.00	7.500
	20,00,000	1.00		10.276

(ii)   Computation of Weighted Average Cost of Capital based on Market Value Weights

Source of Capital	Market Value (Rs.)	Weights to Total Capital	After tax Cost of capital (%)	WACC (%)
Debentures (8,000 units × Rs.110)	8,80,000	0.2651	4.29	1.137
Pref. Shares (2,000 shares × Rs.120)	2,40,000	0.0723	10.60	0.766
Equity Shares (1,00,000 shares × Rs.22)	22,00,000	0.6626	15.00	9.939
	33,20,000	1.00		11.842

(Sol-4)

Pattern of raising Capital:

Portion of Debt = Rs. 20,00,000 × 25% = Rs. 5,00,000 and

Portion of Equity = Rs. 20,00,000 × 75% = Rs. 15,00,000, of this Rs. 4,00,000 is from retained earnings and Rs.11,00,000 by issuing fresh equity shares.

(i)   Cost of Debt (K_d) = $\dfrac{\text{Total Interest } (1\text{-}t)}{\text{Debt}}$

$$= \frac{\left(10\% \text{ of Rs.2,00,000} + 13\% \text{ of Rs.3,00,000}\right)(1-0.3)}{Rs.5,00,000} = \frac{Rs.59,000(1-0.3)}{Rs.5,00,000} = 0.0826 \text{ or } 8.26\%$$

(ii)   Cost of Equity (K_e) = $\dfrac{\text{EPS x Payout ratio } (1+g)}{P_0} + g$

$$= \frac{\text{Rs.12 x 0.5 } (1+0.1)}{Rs.60} + 0.1 = 0.11 + 0.10 = 0.21 \text{ or } 21\%$$

Cost of retained earnings (K_s) = $K_e (1 - t_p)$ = 0.21(1 ƒ{ 0.2) = 0.168 or 16.8%

(iii)   Weighted average cost of capital (K_o)

Source of capital	Amount (Rs.)	Proportion of total Capital	Cost of Capital (%)	WACC (%)
Equity Capital	11,00,000	0.55	21.00	11.550
Retained earning	4,00,000	0.20	16.80	3.360
Debt	5,00,000	0.25	8.26	2.065
Total	20,00,000	1.00		16.975

CAPITAL BUDGETING
To be discussed only in classroom

(Sol-1)

(i)   Net Present Value at different discounting rates

Project	0%	10%	15%	30%	40%
	Rs.	Rs.	Rs.	Rs.	Rs.
C	8,000	4,139	2,654	-632	- 2,158
	{Rs. 2,000	{Rs. 2,000 x 0.909	{Rs. 2,000 x 0.8696	{Rs. 2,000 x 0.7692	{Rs. 2,000 x0.7143
	+Rs. 4,000	+Rs. 4,000 x 0.8264	+ Rs. 4,000 x 0.7561	+ Rs. 4,000 x 0.5917	+ Rs. 4,000 x 0.5102
	+Rs. 12,000	+Rs. 12,000 x 0.7513	+ Rs. 12,000 x 0.6575	+Rs. 12,000 x 0.4552	+ Rs. 12,000 x 0.3644
	-Rs. 10,000}	- Rs. 10,000}	- Rs. 10,000}	- Rs. 10,000}	- Rs. 10,000}
Ranking	I	I	II	II	II
D	6,000	3,823	2,937	833	- 233
	{Rs. 10,000	{Rs. 10,000 x 0.909	{Rs. 10,000 x 0.8696	{Rs. 10,000 x 0.7692	{Rs. 10,000 x 0.7143
	+Rs. 3,000	+Rs. 3,000 x 0.8264	+Rs. 3,000 x 0.7561	+ Rs. 3,000 x 0.5917	+Rs. 3,000 x 0.5102
	+Rs. 3,000	+Rs. 3,000 x 0.7513	+Rs. 3,000 x 0.6575	+ Rs. 3,000 x 0.4552	+Rs. 3,000 x 0.3644
	- Rs. 10,000}	- Rs. 10,000}	- Rs. 10,000}	- Rs. 10,000}	- Rs. 10,000}
Ranking	II	II	I	I	I

The conflict in ranking arises because of skewness in cash flows. In the case of Project C cash flows occur later in the life and in the case of Project D, cash flows are skewed towards the beginning.

At lower discount rate, project C's NPV will be higher than that of project D. As the discount rate increases, Project C's NPV will fall at a faster rate, due to compounding effect.

After break even discount rate, Project D has higher NPV as well as higher IRR.

(ii)   If the opportunity cost of funds is 10%, project C should be accepted because the firm's wealth will increase by Rs. 316 (Rs. 4,139 - Rs. 3,823)

The following statement of incremental analysis will substantiate the above point.

Project	Cash Flows (Rs.)				NPV at 10% Rs.	IRR 12.5%
	C_0	C_1	C_2	C_3		
	Rs.	Rs.	Rs.	Rs.		
C- D	0	- 8,000	1,000	9,000	316	0
					{- 8,000 x 0.909	{- 8,000 x 0.88884
					+1,000 x 0.8264	+ 1,000 x 0.7898
					+ 9,000 x 0.7513}	+ 9,000 x 0.7019}

Hence, the project C should be accepted, when opportunity cost of funds is 10%.

(Sol-2)

(i) **Estimation of net present value (NPV) of the Project 'P' and 'J ' using 15% as the hurdle rate:**

NPV of Project 'P' :

$$= -40,000 + \frac{13,000}{(1.15)^1} + \frac{8,000}{(1.15)^2} + \frac{14,000}{(1.15)^3} + \frac{12,000}{(1.15)^4} + \frac{11,000}{(1.15)^5} + \frac{15,000}{(1.15)^6}$$

= - 40,000 + 11,304.35 + 6,049.15 + 9,205.68 + 6,861.45 + 5,469.37 + 6,485.65

= Rs. 5,375.65　　　　or　　　　Rs. 5,376

NPV of Project 'J'

$$= -20,000 + \frac{7,000}{(1.15)^1} + \frac{13,000}{(1.15)^2} + \frac{12,000}{(1.15)^3}$$

= - 20,000 + 6,086.96 + 9,829.87 + 7,890.58

= Rs. 3,807.41

(ii) **Estimation of internal rate of return (IRR) of the Project 'P' and 'J'**

Internal rate of return r (IRR) is that rate at which the sum of cash inflows after discounting equals to the discounted cash out flows. The value of r in the case of given projects can be determined by using the following formula:

$$CO_0 = \frac{CF_0}{(1+r)^0} + \frac{CF_1}{(1+r)^1} + - - - - - + \frac{CF_n}{(1+r)^n} + \frac{SV + WC}{(1+r)^n}$$

Where,

C_0 = Cash flows at the time O

CF_t = Cash inflow at the end of year t

r = Discount rate

n = Life of the project

SV & WC = Salvage value and working capital at the end of n years.

In the case of project 'P' the value of r (IRR) is given by the following relation:

$$40,000 = \frac{13,000}{(1+r\%)^1} + \frac{8,000}{(1+r\%)^2} + \frac{14,000}{(1+r\%)^3} + \frac{12,000}{(1+r\%)^4} + \frac{11,000}{(1+r\%)^5} + \frac{15,000}{(1+r\%)^6}$$

r = 19.73%

Similarly we can determine the internal rate of return for the project 'J'. In the case of project 'J' it comes to:

r = 25.20%

(iii)   The conflict between NPV and IRR rule in the case of mutually exclusive project situation arises due to re-investment rate assumption. NPV rule assumes that intermediate cash flows are reinvested at k and IRR assumes that they are reinvested at r. The assumption of NPV rule is more realistic.

(iv)   When there is a conflict in the project choice by using NPV and IRR criterion, we would prefer to use "Equal Annualized Criterion". According to this criterion the net annual cash inflow in the case of Projects 'P' and 'J' respectively would be:

Project 'P'   = (Net present value/ cumulative present value of Re.1 p.a. @15% for

                  6 years)

                  = (Rs. 5,375.65 / 3.7845) = Rs. 1,420.44

Project 'J'   = (Rs. 3807.41/2.2832) = Rs. 1667.58

Advise : Since the cash inflow per annum in the case of project 'J' is more than that of project 'P', so Project J is recommended.

(Sol-3)

(i)   Computation of NPV and IRR

For Project A:

Years	Cash flows Rs.000	PVF 10%	P.V. '000	PVF 20%	P.V. '000
0	-500	1.00	-500.00	1.00	-500.00
1	85	0.91	77.35	0.83	70.55
2	200	0.83	166.00	0.69	138.00
3	240	0.75	180.00	0.58	139.20
4	220	0.68	149.60	0.48	105.60
5	70	0.62	43.40	0.41	28.70
	NPV		+116.35		-17.95

NPV of Project A at 10% (Cost of Capital) is Rs. 1,16,350.

IRR of Project A may be calculated by interpolation method as under:

NPV at 20% is (-) 17.95 (Rs. Rs.000)

NPV at 10% is + 116.35 (Rs. Rs.000)

$$\therefore \text{IRR} = 10 + \frac{116.35}{116.35 - (-17.95)}(20-10)\% = 18.66\%$$

For Project B:

Years	Cash flows (Rs.'000)	PVF 10%	P.V. (Rs. '000)	PVF 20%	P.V. (Rs. '000)
0	-500	1.00	-500	1.00	-500
1	480	0.91	436.80	0.83	398.40
2	100	0.83	83.00	0.69	69.00
3	70	0.75	52.50	0.58	40.60
4	30	0.68	20.40	0.48	14.40
5	20	0.62	12.40	0.41	8.20
	NPV		+105.10		+ 30.60

NPV of Project B at 10% (Cost of Capital) is Rs. 1,05,100.

IRR of Project B is calculated by interpolation method as under:

NPV at 10% = + 105.10 (Rs. Rs.000)

NPV at 20% = + 30.60 (Rs. Rs.000)

$$\text{IRR} = 10 + \frac{105.10}{105.10 - 30.60}(20-10)\% = 24.10$$

   (Note: Though in above solution discounting factors of 10% and 20% have been used. However, instead of 20%, students may assume any rate beyond 20%, say 26%, and then NPV becomes negative. In such a case, the answers of IRR of Project may slightly vary from 24.10%.)

(ii)   The ranking of the projects will be as under:

	NPV	IRR
Project A	1	2
Project B	2	1

   There is a conflict in ranking. IRR assumes that the project cash flows are reinvested at IRR whereas the cost of capital is 10%. The two projects are mutually exclusive. In the circumstances, the project which yields the larger NPV will earn larger cash flows. Hence the project with larger NPV should be chosen. Thus Project A qualifies for selection.

(iii)   Inconsistency in ranking arises because if NPV criterion is used, Project A is preferable. If IRR criterion is used, Project B is preferable. The inconsistency is due to the difference in the pattern of cash flows.

Where an inconsistency is experienced, the projects yielding larger NPV is preferred because of larger cash flows which it generates. IRR criterion is rejected because of the following reasons:

(a)   IRR assumes that all cash flows are re-invested at IRR.

(b)   IRR is a percentage but the magnitude of cash flow is important.

(c)   Multiple IRR may arise if the projects have non-conventional cash flows.

(Sol-4)

(a)   Working Notes:

1.   Annual Depreciation of Machines

Depreciation of Machine 'MX' = $\dfrac{\text{Rs.8,00,000-Rs.20,000}}{6} = Rs.1,30,000$

Depreciation of Machine 'MY' = $\dfrac{\text{Rs.10,20,000-Rs.30,000}}{6} = Rs.1,65,000$

1.   Calculation of Cash Inflows

Machine 'MX'	Years					
	1	**2**	**3**	**4**	**5**	**6**
Income before Depreciation & Tax	2,50,000	2,30,000	1,80,000	2,00,000	1,80,000	1,60,000
Less: Depreciation	1,30,000	1,30,000	1,30,000	1,30,000	1,30,000	1,30,000
Profit before Tax	1,20,000	1,00,000	50,000	70,000	50,000	30,000
Less : Tax @ 30%	36,000	30,000	15,000	21,000	15,000	9,000
Profit after Tax (PAT)	84,000	70,000	35,000	49,000	35,000	21,000
Add: Depreciation	1,30,000	1,30,000	1,30,000	1,30,000	1,30,000	1,30,000
Cash Inflows	2,14,000	2,00,000	1,65,000	1,79,000	1,65,000	1,51,000

Machine 'MY'	Years					
	1	**2**	**3**	**4**	**5**	**6**
Income before Depreciation & Tax	2,70,000	3,60,000	3,80,000	2,80,000	2,60,000	1,85,000
Less: Depreciation	1,65,000	1,65,000	1,65,000	1,65,000	1,65,000	1,65,000
Profit before Tax	1,05,000	1,95,000	2,15,000	1,15,000	95,000	20,000
Less : Tax @ 30%	31,500	58,500	64,500	34,500	28,500	6,000
Profit after Tax (PAT)	73,500	1,36,500	1,50,500	80,500	66,500	14,000
Add: Depreciation	1,65,000	1,65,000	1,65,000	1,65,000	1,65,000	1,65,000
Cash Inflows	2,38,500	3,01,500	3,15,500	2,45,500	2,31,500	1,79,000

(i)   **Calculation of Payback Period**

Cumulative Cash Inflows

	Years					
	1	**2**	**3**	**4**	**5**	**6**
Machine 'MX'	2,14,000	4,14,000	5,79,000	7,58,000	9,23,000	10,74,000
Machine 'MY'	2,38,500	5,40,000	8,55,500	11,01,000	13,32,500	15,11,500

Pay-back Period for 'MX'

$$= 4 + \frac{(8,00,000 - 7,58,000)}{1,65,000}$$

= 4.25 years or 4 years and 3 months.

Pay-back Period for 'MY'

$$= 3 + \frac{(10,20,000 - 8,55,500)}{2,45,500} = 3 + 0.67 = 3.67 \text{ years}$$

Or, 3 years and 8 months.

(ii)   **Calculation of Net Present Value (NPV)**

Year	PV Factor	Machine 'MX'		Machine 'MY'	
		Cash Inflows Rs.	**Present Value Rs.**	**Cash Inflows Rs.**	**Present Value Rs.**
0	1.000	(8,00,000)	(8,00,000)	(10,20,000)	(10,20,000)
1	0.909	2,14,000	1,94,526	2,38,500	2,16,797
2	0.826	2,00,000	1,65,200	3,01,500	2,49,039
3	0.751	1,65,000	1,23,915	3,15,500	2,36,941
4	0.683	1,79,000	1,22,257	2,45,500	1,67,677
5	0.621	1,65,000	1,02,465	2,31,500	1,43,762
6	0.564	1,51,000	85,164	1,79,000	1,00,956
Scrap Value	0.564	20,000	11,280	30,000	16,920
Net Present Value (NPV)			4,807		1,12,092

(iii)   **Recommendation**

	Machine Rs.MX'	Machine Rs.MY'
Ranking according to Pay-back Period	II	I
Ranking according to Net Present Value (NPV)	II	I

Advise: Since Machine Rs.MY' has higher ranking than Machine Rs.MX' according to both parameters, i.e. Payback Period as well as Net Present Value, therefore, Machine Rs.MY' is recommended.

ESTIMATION OF WORKING CAPITAL

To be discussed only in classroom

(Sol-1)

Working Notes:

1. **Raw material inventory:** The cost of materials for the whole year is 60% of the Sales value. Hence it is 60,000 units x Rs. 5 x $\dfrac{60}{100}$ = Rs. 1,80,000. The monthly consumption of raw material would be Rs. 15,000. Raw material requirements would be for two months; hence raw materials in stock would be Rs. 30,000.

2. **Work-in-process:** (Students may give special attention to this point). It is stated that each unit of production is expected to be in process for one month).

		Rs.
(a)	Raw materials in work-in-process (being one month's raw material requirements)	15,000
(b)	Labour costs in work-in-process	1,250

   (It is stated that it accrues evenly during the month. Thus, on the first day of each month it would be zero and on the last day of month the work-in-process would include one month's labour costs. On an average therefore, it would be equivalent to ½ of the

   month's labour costs) $\left(\dfrac{10\% \text{ of } (60,000 \text{ x Rs.5})}{12 \text{ months}} \text{ x } 0.5 \text{ month} \right)$

(c)	Overheads	
	(For ½ month as explained above)	2,500

$\left(\dfrac{20\% \text{ of } (60,000 \text{ x Rs.5})}{12 \text{ months}} \text{ x } 0.5 \text{ month} \right)$ Total work-in process   18,750

3. **Finished goods inventory:**

  (3 month's cost of production)

Raw materials $\left(\dfrac{60\% \text{ of } (60,000 x Rs.5)}{12 \text{ mnonths}} \text{ x } 3 \text{ months} \right)$	45,000	
Labour $\left(\dfrac{10\% \text{ of } (60,000 \text{ x Rs.5})}{12 \text{ months}} \text{ x } 3 \text{ months} \right)$	7,500	
Overheads $\left(\dfrac{20\% \text{ of } (60,000 \text{ x Rs.5})}{12 \text{ months}} \text{ x } 3 \text{ months} \right)$	15,000	67,500

4.   **Debtors:** The total cost of sales = 2,70,000.

Therefore, debtors = Rs.2,70,000 × $\dfrac{3}{12}$ = Rs.67,500

Total Cost of Sales = RM + Wages + Overheads + Opening Finished goods inventory – Closing finished goods inventory.

= Rs.1,80,000 + Rs.30,000 + Rs.60,000 + Rs.67,500 – Rs.67,500 = Rs.2,70,000.

5.   **Creditors:** Suppliers allow a two months' credit period. Hence, the average amount of creditors would be two months consumption of raw materials i.e.

$\left(\dfrac{60\% \text{ of } (60,000 \text{ x Rs.5})}{12 \text{ months}} \text{ x 2 months} \right) = Rs.30,000$

6.   **Direct Wages payable:** $\left(\dfrac{10\% \text{ of } (60,000 \text{ x Rs.5})}{12 \text{ months}} \text{ x 1 month} \right) = Rs.2,500$

7.   **Overheads Payable:** $\left(\dfrac{20\% \text{ of } (60,000 x Rs.5)}{12 \text{ months}} \text{ x 1 month} \right) = Rs.5,000$

Here it has been assumed that inventory level is uniform throughout the year, therefore opening inventory equals closing inventory.

Statement of Working Capital Required:

	Rs.	Rs.
Current Assets		
Raw materials inventory (Refer to working note 1)	30,000	
Debtors (Refer to working note 2)	67,500	
Working–in-process (Refer to working note 3)	18,750	
Finished goods inventory (Refer to working note 4)	67,500	
Cash	20,000	2,03,750
Current Liabilities		
Creditors (Refer to working note 5)	30,000	
Direct wages payable (Refer to working note 6)	2,500	
Overheads payable (Refer to working note 7)	5,000	37,500
Estimated working capital requirements		**1,66,250**

(Sol-2)

Preparation of Statement of Working Capital Requirement for MNP Company Ltd.

		(Rs.)	(Rs.)
A.	**Current Assets**		
(i)	**Inventories :**		
	Material (1 month) $\left(\dfrac{Rs.9,00,000}{12 \text{ months}} \text{ x 1 month} \right)$	75,000	
	Finished goods (1 month) $\left(26,40,000 \text{ x } \dfrac{1}{12} \right)$	2,20,000	
(ii)	Receivables (Debtors)		
	For Domestic Sales $\left(20,20,000 \text{ x } \dfrac{1}{12} \right)$	1,68,333	
	For Export Sales $\left(10,10,000 \text{ x } \dfrac{3}{12} \right)$	2,52,500	
(iii)	Prepayment of Sales promotion expenses $\left(\dfrac{Rs.1,50,000}{12 \text{ months}} \text{ x 3 months} \right)$		37,500
(iii)	Cash in hand and at bank		1,75,000
	Total Current Assets		9,47,759
B.	**Current Liabilities :**		
(i)	Payables (Creditors) for materials (2 months) $\left(\dfrac{Rs.9,00,000}{12 \text{ months}} \text{ x 2 months} \right)$		1,50,000
(ii)	Outstanding wages (0.5 months) $\left(\dfrac{Rs.7,20,000}{12 \text{ months}} \text{ x 0.5 month} \right)$		30,000
(iii)	Outstanding manufacturing expenses $\left(\dfrac{Rs.10,20,000}{12 \text{ months}} \text{ x 1 month} \right)$		85,000
(iv)	Outstanding administrative expenses $\left(\dfrac{Rs.2,40,000}{12 \text{ months}} \text{ x 1 month} \right)$		20,000
(v)	Income tax payable		56,250
	Total Current Liabilities		3,41,250
	Net Working Capital (A-B)		6,06,509
Add :	12% Contingency margin		72,781
	Total Working Capital Required		6,79,290

Working Note :

1. **Calculation of Cost of Goods Sold and Cost of Sales**

	Domestic (Rs.)	Export (Rs.)	Total (Rs.)
Domestic Sales	24,00,000	10,80,000	34,80,000
Less : Gross Profit @ 20% on domestic sales and 11.11% on export sales (Working Note-2)	(4,80,000)	(1,20,000)	(6,00,000)
Cost of Goods Sold	19,20,000	9,60,000	28,80,000
Add : Sales promotion expenses (Working Note-3)	1,03,448	46,552	1,50,000
Cash Cost of Sales	20,23,448	1,06,552	30,30,000

2. **Calculation of gross profit on Export Sales :**

Let domestic selling price is Rs.100. Gross profit is Rs.20, and then cost per unit is Rs.80.

Export price is 10% less than the domestic price i.e. Rs.100- (1-0.1) = Rs.90.

Now gross profit will be Rs.90-Rs.80=Rs.10.

Therefore Gross profit at domestic price will be $\dfrac{Rs.10}{Rs.100}$ x 100 = 10%.

Or , gross profit at export price will be $\dfrac{Rs.10}{Rs.90}$ x 100 = 11.11%.

3. **Apportionment of Sales Promotion expenses between Domestic and Exports Sales :**

Apportionment on the basis of sales value :

Domestic Sales = $\dfrac{Rs.1,50,000}{Rs.34,80,000}$ x Rs.24,00,000 =Rs.1,03,448

Export Sales = $\dfrac{Rs.1,50,000}{Rs.34,80,000}$ x 10,80,000 = Rs.46,552

4. **Assumptions**

(i) It is assumed that administrative expenses relating to production activities.

(ii) Value of opening and closing stocks are equal.

(Sol-3)

Calculation of Net Working Capital requirement:

	(Rs.)	(Rs.)
A. Current Assets:		
Inventories:		
- Raw material stock (Refer to Working note 3)	6,64,615	
- Work in progress stock (Refer to Working note 2)	5,00,000	
- Finished goods stock(Refer to Working note 4)	13,60,000	
Receivables (Debtors) (Refer to Working note 5)	25,40,769	
Cash and Bank balance	25,000	
Gross Working Capital	50,60,384	50,60,384
B. **Current Liabilities:**		
Creditors for raw materials (Refer to Working note 6)	7,15,740	
Creditors for wages (Refer to Working note 7)	91,731	
	8,07,471	8,07,471
Net Working Capital (A - B)		42,52,913

Working Notes:

1.   **Annual cost of production**

	(Rs.)
Raw material requirements {(1,04,000 units × Rs. 80)+ Rs.3,20,000}	86,40,000
Direct wages {(1,04,000 units × Rs. 30) + Rs.60,000}	31,80,000
Overheads (exclusive of depreciation) {(1,04,000 × Rs. 60)+ Rs.1,20,000}	63,60,000
Gross Factory Cost	1,81,80,000
Less: Closing W.I.P	(5,00,000)
Cost of Goods Produced	1,76,80,000
Less: Closing Stock of Finished Goods (Rs.1,76,80,000 × 8,000/1,04,000)	(13,60,000)
Total Cash Cost of Sales	1,63,20,000

2.   **Work in progress stock**

	(Rs.)
Raw material requirements (4,000 units × Rs. 80)	3,20,000
Direct wages (50% × 4,000 units × Rs. 30)	60,000
Overheads (50% × 4,000 units × Rs. 60)	1,20,000
	5,00,000

3.   **Raw material stock**

It is given that raw material in stock is average 4 weeks consumption. Since, the company is newly formed, the raw material requirement for production and work in progress will be issued and consumed during the year.

Hence, the raw material consumption for the year (52 weeks) is as follows:

(Rs.)

For Finished goods (1,04,000 × Rs. 80)	83,20,000
For Work in progress (4,000 × Rs. 80)	3,20,000
	86,40,000

Raw material stock $\dfrac{\text{Rs.86,40,000}}{52 \text{ weeks}}$ x 4 weeks i.e. Rs.6,64,615

4.   **Finished goods stock:** 8,000 units @ Rs. 170 per unit = Rs. 13,60,000

5.   **Debtors for sale:** 1,63,20,000 x $\dfrac{8}{52}$ = Rs.25,10,769

6.   **Creditors for raw material:**

Material Consumed (Rs. 83,20,000 + Rs. 3,20,000)   Rs. 86,40,000

Add: Closing stock of raw material   Rs. 6,64,615

                                                              Rs. 93,04,615

Credit allowed by suppliers = $\dfrac{\text{Rs.93,04,615}}{52 \text{ weeks}}$ x 4 weeks = Rs.7,15,740

7.   **Creditors for wages**

Outstanding wage payment = $\dfrac{\text{Rs.93,04,615}}{52 \text{ weeks}}$ x 1.5 weeks= Rs.91,731

Homework

(Sol-1)

Statement of Working Capital requirements (cash cost basis)

		(Rs.)	(Rs.)
A.	**Current Asset**		
	Inventory:		
	Raw materials : $\left(\dfrac{\text{Rs.9,00,000}}{12 \text{ months}} \times 1 \text{ month}\right)$	75,000	
	Finished Goods : $\left(\dfrac{\text{Rs.25,80,000}}{12 \text{ months}} \times 1 \text{ month}\right)$	2,15,000	
	Receivables (Debtors) : $\left(\dfrac{\text{Rs.29,40,000}}{12 \text{ months}} \times 2 \text{ months}\right)$	4,90,000	
	Sales Promotion expenses paid in advance		
	$\left(\dfrac{\text{Rs.1,20,000}}{12 \text{ months}} \times 3 \text{ months}\right)$	30,000	
	Cash balance	1,00,000	9,10,000
	Gross Working Capital		**9,10,000**
B.	**Current Liabilities:**		
	Payables:		
	Creditors for materials $\left(\dfrac{\text{Rs.9,00,000}}{12 \text{ months}} \times 2 \text{ months}\right)$	1,50,000	
	Wages outstanding $\left(\dfrac{\text{Rs.7,20,000}}{12 \text{ months}} \times 1 \text{ month}\right)$	60,000	
	Manufacturing expenses outstanding		
	$\left(\dfrac{\text{Rs.9,60,000}}{12 \text{ months}} \times 1 \text{ month}\right)$	80,000	
	Administrative expenses outstanding		
	$\left(\dfrac{\text{Rs.2,40,000}}{12 \text{ months}} \times 1 \text{ month}\right)$	20,000	3,10,000
	Net working capital (A - B)		6,00,000
	Add: Safety margin @ 20%		1,20,000
	Total Working Capital requirements		**7,20,000**

Working Notes:

(i)	**Computation of Annual Cash Cost of Production**	**(Rs.)**
	Material consumed	9,00,000
	Wages	7,20,000
	Manufacturing expenses	9,60,000
	Total cash cost of production	25,80,000
(ii)	**Computation of Annual Cash Cost of Sales:**	**(Rs.)**
	Cash cost of production as in (i) above	25,80,000
	Administrative Expenses	2,40,000
	Sales promotion expenses	1,20,000
	Total cash cost of sales	29,40,000

Since, the cash manufacturing expenses is already given in the question hence, the amount of depreciation need not to be computed. However, if it were required to be then it could be computed as follows:

	(Rs.)
Sales	36,00,000
Less: Gross profit (25% of Rs.36,00,000)	(9,00,000)
Cost of Production (including depreciation)	27,00,000
Less: Cash Cost of Production (as calculated above)	(25,80,000)
Depreciation (Balancing figure)	1,20,000

(Sol-2)

(a)   **Computation of Operating Cycle**

(1)   **Raw Material Storage Period (R)**

Raw Material Storage Period (R) = $\dfrac{\text{Average Stock of Raw Material}}{\text{Daily Average Consumption of Raw Material}}$

$= \dfrac{(1,80,000 + 2,00,000)/2}{10,80,000/360} = 63.33 \text{ Days}$

Raw Material Consumed = Opening Stock + Purchases – Closing Stock

= 1,80,000 + 11,00,000 – 2,00,000 = Rs.10,80,000

(2)   **Conversion/Work-in-Process Period (W)**

Conversion/Processing Period $= \dfrac{\text{Average Stock of WIP}}{\text{Daily Average Production Cost}}$

$= \dfrac{(60,000 + 1,00,000)/2}{15,40,000/360} = 18.7 \text{ days}$

Production Cost:

Opening Stock of WIP	=		60,000
Add: Raw Material Consumed	=		10,80,000
Add: Wages		=	3,00,000
Add: Production Expenses		=	2,00,000
			16,40,000
Less: Closing Stock of WIP		=	1,00,000
Production Cost			**15,40,000**

(3)   **Finished Goods Storage Period (F)**

Finished Goods Storage Period = $\dfrac{\text{Average Stock of Finished Goods}}{\text{Daily Average Cost of Goods Sold}}$

$= \dfrac{(2,60,000 + 3,00,000)/2}{15,00,000/360} = 67.19 \text{ Days}$

Cost of Goods Sold	**Rs.**
Opening Stock of Finished Goods	2,60,000
Add: Production Cost	15,40,000
	18,00,000
Less: Closing Stock of Finished Goods	3,00,000
	15,00,000

(4)   **Debtors Collection Period (D)**

Debtors Collection Period $= \dfrac{\text{Average Debtors}}{\text{Daily Average Sales}} = \dfrac{(1,50,000 + 2,00,000)/2}{20,00,000/360} = 31.5 \text{ Days}$

(5)   **Creditors Payment Period (C)**

Creditors Payment Period $= \dfrac{\text{Average Creditors}}{\text{Daily Average Purchase}}$

$= \dfrac{(2,00,000 + 2,40,000)/2}{11,00,000/360} = 72 \text{ Days}$

(6)   **Duration of Operating Cycle (O)**

O   = R + W + F + D – C

        = 63.33 + 18.7 + 67.19 + 31.5 – 72

        = 108.73 days

Computation of Working Capital

(i)   **Number of Operating Cycles per Year**

        = 360/Duration Operating Cycle = 360/108.72 = 3.311

(ii)   **Total Operating Expenses**   **Rs.**

Total Cost of Production	15,00,000
Add: Administration Expenses	1,75,000
Selling Expenses	75,000
	17,50,000

(iii)   **Working Capital Required**

Working Capital Required $= \dfrac{\text{Total Operating Expenses}}{\text{Number of Operating Cycles per year}}$

$= \dfrac{17,50,000}{3.311} = \text{Rs.}5,28,541$

[Note : The solution can also be solved by taking of 365 days a year.]

(Sol-3)

Estimation of Working Capital Needs

		(Amount in Rs.)	(Amount in Rs.)
A.	**Current Assets**		
(i)	**Inventories:**		
	Raw material (4 weeks)		
	$\left(\dfrac{78,000 \text{ units x Rs.117}}{52 \text{ weeks}} \text{ x 4 weeks} \right)$	7,02,000	
	WIP Inventory (2 weeks)		
	- Material $\left(\dfrac{78,000 \text{ units x Rs.117}}{52 \text{ weeks}} \text{ x 2 weeks} \right)$ x 0.80	2,80,800	
	- Labour and Overheads (other than depreciation)	5,13,000	
	$\left(\dfrac{78,000 \text{ units x Rs.129}}{52 \text{ weeks}} \text{ x 2 weeks} \right)$ x 0.60		
	Finished goods (3 weeks)		
	$\left(\dfrac{78,000 \text{ units x Rs.246}}{52 \text{ weeks}} \text{ x 3 weeks} \right)$	11,07,000	26,02,800
(ii)	Receivables (Debtors) (6 weeks)		
	$\left(\dfrac{78,000 \text{ units x Rs.246}}{52 \text{ weeks}} \text{ x 6 weeks} \right)$ x $\dfrac{4}{5th}$		17,71,200
(iii)	Cash and bank balance		2,50,000
	Total Current Assets		**43,43,200**
B.	**Current Liabilities:**		
(i)	Payables (Creditors) for materials (8 weeks)		
	$\left(\dfrac{78,000 \text{ units x Rs.117}}{52 \text{ weeks}} \text{ x 8} \rightarrow \text{ weeks} \right)$		14,04,000
(ii)	Outstanding wages (1 week)		
	$\left(\dfrac{78,000 \text{ units x Rs.49}}{52 \text{ weeks}} \text{ x 1 week} \right)$		73,500
(iii)	Outstanding overheads (2 weeks)		
	$\left(\dfrac{78,000 \text{ units x Rs.80}}{52 \text{ weeks}} \text{ x 2 weeks} \right)$		2,40,000
	Total Current Liabilities		17,17,500
	Net Working Capital Needs (A – B)		26,25,700

(Sol-4)

Working Notes:

1. Raw material inventory: The cost of materials for the whole year is 60% of the Sales value.

$$= \frac{54,000 \text{ units x } (60\% \text{ of Rs.200})}{12 \text{ months}} \text{ x 2 months} = Rs.10,80,000$$

2. Work-in-process: (Each unit of production is expected to be in process for one month):

		(Rs.)
(a)	Raw materials in work-in-process (being one month's raw material requirements)	5,40,000
(b)	Labour costs in work-in-process $\left(\frac{54,000 \text{ units x } (10\% \text{ of Rs.200})}{12 \text{ months}} \text{ x 1 month} \right) \text{ x 0.5}$	45,000
(c)	Overheads $\left(\frac{54,000 \text{ units x } (20\% \text{ of Rs.200})}{12 \text{ months}} \text{ x 1 month} \right) \text{ x 0.5}$	90,000
		6,75,000

3. Finished goods inventory: $\frac{54,000 \text{ units x } (90\% \text{ of Rs.200})}{12 \text{ months}}$ x 1 month = Rs.8,10,000

4. Receivables: $\frac{54,000 \text{ units x } (90\% \text{ of Rs.200})}{12 \text{ months}}$ x 1.5 month = Rs.12,15,000

5. Payable to suppliers: $\frac{54,000 \text{ units x } (60\% \text{ of Rs.200})}{12 \text{ months}}$ x 1 month = Rs.5,40,000

6. Direct Wages payable: $\frac{54,000 \text{ units x } (10\% \text{ of Rs.200})}{12 \text{ months}}$ x 1 month = Rs.90,000

Calculation of Working Capital Requirement

		(Rs.)	(Rs.)
A.	Current Assets		
(i)	Inventories:		
	- Raw Materials	10,80,000	
	- Work-in-process	6,75,000	
	- Finished goods	8,10,000	25,65,000
(ii)	Receivables		12,15,000
(iii)	Cash in hand (40% of Rs.6,30,000)		2,52,000

	Total Current Assets	40,32,000
B.	Current Liabilities:	
(i)	Payables for raw materials	5,40,000
(ii)	Direct wages payables	90,000
		6,30,000
	Net Working Capital (A – B)	34,02,000
Add:	Safety margin (15% of Net Working Capital)	5,10,300
	Working capital requirement	39,12,300

(Sol-5)

Effect of Alternative Working Capital Policies

Working Capital Policy	Conservative (Rs.)	Moderate (Rs.)	Aggressive (Rs.)
Sales	20,00,000	20,00,000	20,00,000
Earnings before Interest and Taxes (EBIT)	2,00,000	2,00,000	2,00,000
Current Assets	5,00,000	4,00,000	3,00,000
Fixed Assets	5,00,000	5,00,000	5,00,000
Total Assets	10,00,000	9,00,000	8,00,000
*Return on Total Assets (EBIT÷ Total Assets)	20%	22.22%	25%
Current Assets/Fixed Assets	1.00	0.80	0.60

The aforesaid calculation shows that the conservative policy provides greater liquidity (solvency) to the firm, but lower return on total assets. On the other hand, the aggressive policy gives higher return, but low liquidity and thus is very risky. The moderate policy generates return higher than Conservative policy but lower than aggressive policy. This is less risky than aggressive policy but more risky than conservative policy.

In determining the optimum level of current assets, the firm should balance the profitability – solvency tangle by minimizing total costs – Cost of liquidity and cost of illiquidity.

*Normally we use ROTA = $\dfrac{PAT}{TA}$ x 100 but in this sum we assume EBIT = PAT.

(Sol-6)

Statement showing W.C. requirement

Particulars	Amount (Rs.)

Current Assets :

Stock :

Particulars	Amount (Rs.)
Raw material (800000 x 3/17)	2,00,000
WIP	-
F.G.	3,25,000
Debtors (2440000 x 15/12)	3,05,000
Cash	60,000
(A)	8,90,000

Current Liabilities :

Particulars	Amount (Rs.)
Creditors (800000 + 200000 x 4/12)	3,33,333
O/S Wages (600000 x 1/12)	50,000
O/S O/H (F + A + S) (1365000 x 0.5/12)	36,875
(B)	(4,40,208)
W.C. requirement (A-B) 90%	4,.49,792
(+) Safety Margin 10%	49,977
100%	4,99,769

W.N.

Particulars	Amount	Calculation
Material	8,00,000	(20 x 40,000)
(+) Wages	6,00,000	(15 x 40,000)
(+) FOH (V)	6,00,000	(15 x 40,000)
(F)	6,00,000	(10 x 60,000)
COP	26,00,000	
(+) Op. Stock FG	-	
(-) Closing Stock – FG $\left(\dfrac{26,00,000}{40,000} \times 5000 \right)$	(3,05,000)	
COG	22,75,000	
(+) S&D		
(V)	1,05,000	(3 x 35,000)
(F)	60,000	(1 x 60,000)
COS	24,40,000	

(Sol-7)

Statement of Working Capital

Particulars	Amount (Rs.)
Current Assets :	
Stock	
R/M (6,00,000 x 2/12)	50,000
FG (166,80,000 x 1/12)	1,40,000
Cash balance	80,000
Debtors (1905000 x 2/12)	3,17,500
Prepaid Sales Exp. (75000 x 3/12)	18,750
(A)	6,06,250
Current Liabilities :	
Creditors (6,00,000 x 2/12)	1,00,000
O/S Wages (4,80,000 x 1/12)	40,000
O/S Manufacturing Exps. (6,00,000 x 1/12)	50,000
O/S Admin. Exp. (1,50,000 x 1/12)	12,500
(B)	(2,02,500)
Working Capital	4,03,750
(+) SM @ 10%	40,375
W.C.R.	4,44,125

W.N.1 : Cost Structure

Particulars	Amount (Rs.)
Material	6,00,000
(+ Wages	4,80,000
(+) Manufacturing Exps.	6,00,000
COP	16,80,000
(+) Admin. Exps.	1,50,000
(+) Sales Exps.	75,000
COS	19,05,000

RECEIVABLE MANAGEMENT

To be discussed only in classroom

(Sol-1)

Statement showing the Evaluation of Proposal

Particulars		Rs.
A.	Expected Profit:	
	Net Sales	1,00,000
	Less: Production and Selling Expenses @ 80%	80,000
	Profit before providing for Bad Debts	20,000
	Less: Bad Debts @10%	10,000
	Profit before Tax	10,000
	Less: Tax @ 50%	5,000
	Profit after Tax	5,000
B.	Opportunity Cost of Investment in Receivables	2,500
C.	Net Benefits (A – B)	2,500

Advise: The sales manager's proposal should be accepted.

Working Note: Calculation of Opportunity Cost of Funds

$$\text{Opportunity Cost = Total Cost of Credit Sales x } \frac{\text{Collection period}}{12} \text{ x } \frac{\text{Required Rate of Return}}{100}$$

$$= \text{Rs.80,000 x } \frac{1.5}{12} \text{ x } \frac{25}{100} = \text{Rs.2,500}$$

Statement showing the Acceptable Degree of Risk of Non-payment

Particulars	Required Rate of Return		
	30%	**40%**	**60%**
Sales	1,00,000	1,00,000	1,00,000
Less: Production and Sales Expenses	80,000	80,000	80,000
Profit before providing for Bad Debts	20,000	20,000	20,000
Less: Bad Debts (assume X)	X	X	X
Profit before tax	20,000 – X	20,000 – X	20,000 – X
Less: Tax @ 50%	(20,000 – X) 0.5	(20,000 – X) 0.5	(20,000 – X) 0.5
Profit after Tax	10,000 –0.5X	10,000 –0.5X	10,000 –0.5X
Required Return (given)	30% of 10,000*	40% of 10,000*	60% of 10,000*
	= Rs. 3,000	= Rs. 4,000	= Rs. 6,000

*Average Debtors = Total Cost of Credit Sales x $\dfrac{\text{Collection period}}{12}$

$= Rs.80,000 \times \dfrac{1.5}{12} = Rs.10,000$

Computation of the value and percentage of X in each case is as follows:

Case I	10,000 – 0.5x	= 3,000
	0.5x	= 7,000
	X	= 7,000/0.5 = Rs. 14,000

Bad Debts as % of sales   = Rs. 14,000/Rs.1,00,000 x 100 = 14%

Case II	10,000 – 0.5x	= 4,000
	0.5x	= 6,000
	X	= 6,000/0.5 = Rs. 12,000

Bad Debts as % of sales   = Rs. 12,000/Rs.1,00,000 x 100 = 12%

Case III	10,000 – 0.5x	= 6,000
	0.5x	= 4,000
	X	= 4,000/0.5 = Rs. 8,000

Bad Debts as % of sales   = Rs. 8,000/Rs.1,00,000 x 100 = 8%

        Thus, it is found that the Acceptable Degree of risk of non-payment is 14%, 12% and 8% if required rate of return (after tax) is 30%, 40% and 60% respectively.

(Sol-2)

Statement Showing Evaluation of Credit Policies

(Rs. in lakhs)

Particulars	Current position (1 month)	Option I (1.5 months)	Option II (2 months)	Option III (3 months)
Sales	200	210	220	250
Contribution @ 40%	80	84	88	100
Increase in contribution over current level	-	4	8	20 (A)
Debtors = $\left(\dfrac{\text{Average Collection period x Credit Sales}}{12}\right)$	$\dfrac{1 \times 200}{12}=16.67$	$\dfrac{1.5 \times 210}{12}=16.67$	$\dfrac{2 \times 220}{12}=36.67$	$\dfrac{3 \times 250}{12}=62.50$
Increase in debtors over current level	-	9.58	20.00	45.83
Cost of funds for additional amount of debtors @ 20%	-	1.92	4.00	9.17 (B)

Credit administrative cost	1.20	1.30	1.50	3.00
Increase in credit administration cost over present level	-	0.10	0.30	1.80 (C)
Bad debts	4.00	5.25	6.60	12.50
Increase in bad debts over current levels	-	1.25	2.60	8.50 (D)
Net gain/loss A – (B + C + D)	-	0.73	1.10	0.53

Advise: It is suggested that the company JKL Ltd. should implement Option II with a net gain of Rs.1.10 lakhs which has a credit period of 2 months.

(Sol-3)

In this case, the contribution is 20% i.e., (Rs.1,000 – Rs.800) on Rs.1,000.

Increase of sales by 25% on Rs.48,00,000 (Rs.1,000 x 400 x 12 months) = Rs.12,00,000. The 20% contribution on Rs.12,00,000 = Rs.2,40,000

	Old Customers	Only new customers
Contribution on Additional Sales	Rs.2,40,000	Rs.2,40,000
Present average receivable (1/12 of Rs.48,00,000)	4,00,000	-
Revised average receivable	10,00,000 (1/6 of Rs.60,00,000)	2,00,000 (1/6 of Rs.12,00,000)
Increased receivable	6,00,000	2,00,000
- Contribution @ 20%	1,20,000	40,000
Investment in receivable	4,80,000	1,60,000
+ Increase in stock	2,00,000	2,00,000
	6,80,000	3,60,000
- Increase in creditors	1,00,000	1,00,000
Additional working capital	5,80,000	2,60,000
Desired Return on additional WC @ 40%	2,32,000	1,04,000
Contribution on additional sales	2,40,000	2,40,000
Net contribution	8,000	1,36,000

Though both schemes are acceptable, but margin is better in second scheme.

(Sol-4)

Analysis of the receivables of Jackson Company by the bank in order to identify acceptable collateral for a short-term loan:

(i)   **The Jackson Company's credit policy is 2/10 net 30.**

The bank lends 80 per cent on accounts where customers are not currently overdue and where the average payment period does not exceed 10 days past the net period i.e. thirty days. From the schedule of receivables of Jackson Company Account No. 91 and Account No. 114 are currently overdue and for Account No. 123 the average payment period exceeds 40 days. Hence Account Nos. 91, 114 and 123 are eliminated. Therefore, the selected Accounts are Account Nos. 74, 107, 108 and 116.

(ii)   **Statement showing the calculation of the amount which the bank will lend on a pledge of receivables if the bank uses a 10 per cent allowances for cash discount and returns**

Account No.	Amount (Rs.) (a)	90 per cent of amount (Rs.) (b)=90% of (a)	80% of amount (Rs.) (c)=80% of (b)
74	25,000	22,500	18,000
107	11,500	10,350	8280
108	2,300	2,070	1,656
116	29,000	26,100	20,880
		Total loan amount	48,816

(Sol-5)

New level of sales will be 15,00,000 x 1.15 = Rs. 17,25,000

Variable costs are 80% x 75% = 60% of sales

Contribution from sales is therefore 40% of sales

Fixed Cost are 20 % x 75% = 15% of sales

Particulars	Rs.	Rs.
Proposed investment in debtors = Variable Cost + Fixed		
Cost* = (17,25,000 x 60%) + (15,00,000 x 15%)		
= (10,35,000 + 2,25,000) x $\dfrac{60}{360}$		2,10,000
Current investment in debtors = [(15,00,000 x 60%) + (15,00,000 x 15%)] x $\dfrac{30}{360}$		93,750
Increase in investment in debtors		1,16,250
Increase in contribution = 15% x 15,00,000x 40%		90,000
New level of bad debts = (17,25,000x 4%)	69,000	
Current level of bad debts (15, 00,000 x 1%)	15,000	
Increase in bad debts		(54,000)
Additional financing costs = 1,60,274x 12% =		(13,950)
Savings by introducing change in policy		22,050

* Fixed Cost is taken at existing level in case of proposed investment as well

Advise: Mosaic Limited should introduce the proposed policy.

Homework

(Sol-1)

Statement showing Evaluation of Credit Policies

Particulars	Present Policy (1 month)	Proposed Policy (2 months)
A.　Expected Profit:		
(a)　Net Credit Sales (Sales units × Rs. 40)	8,40,000	9,07,200
(b)　Less: Total Cost:		
Variable (Sales units × Rs. 25)	5,25,000	5,67,000
Fixed Cost	2,10,000	2,10,000
	7,35,000	7,77,000
(c)　Expected Profit [(a)-(b)]	1,05,000	1,30,200
B.　Opportunity Cost of Investment in Receivables	15,313	32,375
C.　Net Benefits [A-B]	89,687	97,825

Recommendation: Proposed Policy should be implemented since the net benefit under this policy are higher than those under present policy.

Working Note: Calculation of Opportunity Cost

$$\text{Opportunity Cost} = \text{Total Cost} \times \frac{\text{Collection Period}}{12} \times \text{Rate of Return}$$

$$\text{Present Policy} = \text{Rs.}7,35,000 \times \frac{1}{2} \times \frac{25}{100} = \text{Rs.}15,313$$

$$\text{Present Policy} = \text{Rs.}7,77,000 \times \frac{2}{12} \times \frac{25}{100} = \text{Rs.}32,375$$

(Sol-2)

Interest Rate = 24% p.a.

Interest Rate for 30 Days

= 24 x 30/365 = 1.9726%

Hence, value of Re today will become 1.019726 after 30 days

$\therefore$ PV today = $\frac{1}{1.019726}$ = 0.780656

Hence discount rate to be offered today for RS 1 to be received after 30 days

= 1 – 0.980656 = 0.019344 @ 1.93%

(Sol-3)

Working Notes:-

Average level of Receivables	= 12,00,000 x 90/360	3,00,000
Factoring Commission	= 3,00,000 x 2/100	6,000
Factoring Reserve	= 3,00,000 x 10/100	30,000

Amount Available for Advance   = Rs. 3,00,000-(6,000+30,000)   2,64,000

Factor will deduct his interest @ 16% :-

Interest $= \dfrac{Rs.2,64,000 \times 16 \times 90}{360 \times 100} = Rs.10,560$

Advance to be paid = Rs. 2,64,000 – Rs. 10,560 = Rs. 2,53,440

Statement Showing Evaluation of Factoring Proposal

	Particulars	Rs.
A.	Annual Cost of Factoring to the Firm:	
	Factoring Commission (Rs. 6,000 x 360/90)	24,000
	Interest Charges (Rs. 10,560 x 360/90)	42,240
	Total	66,240
B.	Firm's Savings on taking Factoring Service:	Rs.
	Cost of Administration Saved	50,000
	Cost of Bad Debts (Rs. 12,00,000 × 1.5/100) avoided	18,000
	Total	68,000
C.	Net Benefit to the Firm (Rs. 68,000 – Rs. 66,240)	1,760

(Sol-4)

Statement showing evaluation of Credit Po

Particulars	Present 30 days	A 45 days	B 60 days	C 75 days	E 90 days
Exp. Profit Sales	5000000	56000000	6000000	6200000	6300000
(-) V.C.@ 80%	(4000000)	(4480000)	(4800000)	(4960000)	(5040000)
(-) F.C.	(600000)	(600000)	(600000)	(600000)	(600000)
	400000	520000	600000	640000	660000
(-) COID (W.N.1)	(76667)	(127000)	(180000)	(231667)	(282000)
N.B.	323333	393000	420000	408333	378000

COID

Present : 10 = 383333

          C = 76667 (383333 x 20%)

A : ID   = 635000 (5080000 x 45/350)

C   = 127000 (688000 x 20%)

B : ID   = 900000 (5000000 x 60/365)

C   = 180000 (900000 x 20%)

C : ID   = 1158333 (5560000 x 75/360)

C   = 231667 (1158333 x 20%)

D : ID   = 1410000 (5640000 x 20/360)

C   = 282000 (1410000 x 20%)

It is advisable to consider Policy B

(Sol-5)

A.   Statement showing the Evaluation of Debtors Policies (Total Approach)

	Particulars	Present Policy 30 days Rs.	Proposed Policy A 40 days Rs.	Proposed Policy B 50 days Rs.	Proposed Policy C 60 days Rs.	Proposed Policy D 75 days Rs.
A.	Expected Profit:					
(a)	Credit Sales	6,00,000	6,30,000	6,48,000	6,75,000	6,90,000
(b)	Total Cost other than Bad Debts					
(i)	Variable Costs [Sales x Rs. 2/Rs. 3]	4,00,000	4,20,000	4,32,000	4,50,000	4,60,000
(ii)	Fixed Costs	50,000	50,000	50,000	50,000	50,000
		4,50,000	4,70,000	4,82,000	5,00,000	5,10,000
(c)	Bad Debts	6,000	9,450	12,960	20,250	27,600
(d)	Expected Profit [(a) – (b) – (c)]	1,44,000	1,50,550	1,53,040	1,54,750	1,52,400
B.	Opportunity Cost of Investments in Receivables	7,500	10,444	13,389	16,667	21,250
C.	Net Benefits (A – B)	1,36,500	1,40,106	1,39,651	1,38,083	1,31,150

Recommendation: The Proposed Policy A (i.e. increase in collection period by 10 days or total 40 days) should be adopted since the net benefits under this policy are higher as compared to other policies.

Working Notes:

(i)   Calculation of Fixed Cost

     = [Average Cost per unit – Variable Cost per unit] x No. of Units sold

= [Rs. 2.25 - Rs. 2.00] x (Rs. 6,00,000/3)

= Rs. 0.25 x 2,00,000 = Rs. 50,000

(ii)   **Calculation of Opportunity Cost of Average Investments**

$$\text{Opportunity Cost} = \text{Total Cost} \times \frac{\text{Collection period}}{360} \times \frac{\text{Rate of Return}}{100}$$

$$\text{Present Policy} = 4,50,000 \times \frac{30}{360} \times \frac{20}{100} = 7,500$$

$$\text{Policy A} = 4,70,000 \times \frac{40}{360} \times \frac{20}{100} = 10,444$$

$$\text{Policy B} = 4,82,000 \times \frac{50}{360} \times \frac{20}{100} = 13,389$$

$$\text{Policy C} = 5,00,000 \times \frac{60}{360} \times \frac{20}{100} = 16,667$$

$$\text{Policy D} = 5,10,000 \times \frac{75}{360} \times \frac{20}{100} = 21,250$$

B.   Another method of solving the problem is Incremental Approach. Here we assume that sales are all credit sales.

	Particulars	**Present Policy 30 days Rs.**	**Proposed Policy A 40 days Rs.**	**Proposed Policy B 50 days Rs.**	**Proposed Policy C 60 days Rs.**	**Proposed Policy D 75 days Rs.**
A.	Incremental Expected Profit:					
(a)	Incremental Credit Sales		30,000	48,000	75,000	90,000
(b)	Incremental Costs					
(i)	Variable Costs	4,00,000	20,000	32,000	50,000	60,000
(ii)	Fixed Costs	50,000	-	-	-	-
(c)	Incremental Bad Debt Losses	6,000	3,450	6,960	14,250	21,600
(d)	Incremental Expected Profit (a – b –c)]		6,550	9,040	10,750	8,400
B.	Required Return on Incremental Investments:					
(a)	Cost of Credit Sales	4,50,000	4,70,000	4,82,000	5,00,000	5,10,000
(b)	Collection period	30	40	50	60	75
(c)	Investment in Receivable (a x b/360)	37,500	52,222	66,944	83,333	1,06,250
(d)	Incremental Investment in Receivables	-	14,722	29,444	45,833	68,750

(e)	Required Rate of Return (in %)		20	20	20	20
(f)	Required Return on Incremental Investments (d x e)	-	2,944	5,889	9,167	13,750
C.	Net Benefits (A – B)	-	3,606	3,151	1,583	5,350

Recommendation: The Proposed Policy A should be adopted since the net benefits under this policy are higher than those under other policies.

C.   Another method of solving the problem is by computing the Expected Rate of Return.

$$\text{Expected Rate of Return} = \frac{\text{Incremental Expected Profit}}{\text{Incremental Investment in Receivables}} \times 100$$

For Policy A $= \dfrac{Rs.6,550}{Rs.14,722} \times 100 = 44.49\%$

For Policy B $= \dfrac{Rs.9,040}{Rs.29,444} \times 100 = 30.0\%$

For Policy C $= \dfrac{Rs.10,750}{Rs.45,833} \times 100 = 23.45\%$

For Policy D $= \dfrac{Rs.8,400}{Rs.68,750} \times 100 = 12.22\%$

Recommendation: The Proposed Policy A should be adopted since the Expected Rate of Return (44.49%) is more than the Required Rate of Return (20%) and is highest among the given policies compared.

(Sol-6)

Statement showing evaluation of credit policy

(in Lakh Rs.)

Particulars	Present (20 d)	P-I (30 d)	P-II (40 d)	P-III (50 d)	P-IV (60 d)
EP Saus	60	65	70	74	75
(-) V.C.@70%	(42)	(45.5)	(49)	(51.8)	(52.5
(-) F.C.	(8)	(8)	(3)	(8)	(8)
	10	11.5	15	14.2	14.5
(-) COID	(0.600)	(1.115)	(1.583)	(2.076)	(2.520)
N.B.	9.306	10.385	11417	12.124	18.979

COID : Present   : 10 : 42 + 8 = 50 x 20/360 = 2.778

                  (=2.778 x 25% = 0.694)

     P-I   :   ID = 45 : 5 + 8 = 53.5% 30.360 = 4.458

                  (4.458 x 25% = 1.115)

     P-II   :   ID = 49 + 8 = 57 x 40/360 = 6.33

                  (= 6.33 x 25% = 1.583

     P-III :   ID = 541.8 + 8 = 59.6 x 50/360 = 8.306

                  (= 8.306 x 25% = 2.076)

     P-IV :   ID = 52.5 + 8 = 60.5 x 60/360 = 10.083

                  (= 10.083 x 25% = 2.521)

Company should consider policy III, (50 d credit) as it will give higher N.B.

(Sol-7)

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Statement showing evaluation of Credit Policy

</div>

(in lakh Rs.)

Particulars	Present	P-I	P-2
EP Sales (-) VC @70% (-) Bad Debts	87.5 (61.25) (2.63)	105 (735) (5.25)	118 (82.6) (7.88)
 (-) COID (W.N.1)	23.62 (2.625)	26.25 (4.2)	27.52 (5.90)
N.B.	20.995	22.05	21.62

COID

Present :   ID = 8.75

            C = 2.625 (8.75 x 30%)

P-1 : ID   = 14 (73.5 x 1/525)

    C   = 4.2 (14 x 30%)

P-II : ID   = 19.67 (82.6 x

    C   = 5.90 (19.67 x 50%)

CASH BUDGET
To be discussed only in classroom

(Sol-1)

Workings:	Rs. in '000		
(1)	Payments to creditors:	Jan. 2014	Feb.2014	March, 2014
	Cost of Sales	1,635	1,405	1,330
	Add Closing Stocks	1,200	1,100	1,000
		2,835	2,505	2,330
	Less: Opening Stocks	1,300	1,200	1,100
	Purchases	1,535	1,305	1,230
	Add: Trade Creditors, Opening balance	2,110	2,000	1,950
		3,645	3,305	3,180
	Less: Trade Creditors, closing balance	2,000	1,950	1,900
	Payment	1,645	1,355	1,280
(2)	Receipts from debtors:			
	Debtors, Opening balances	2,570	2,600	2,500
	Add: Sales	2,100	1,800	1,700
		4,670	4,400	4,200
	Less: Debtors, closing balance	2,600	2,500	2,350
	Receipt	2,070	1,900	1,850

CASH BUDGET

(a)   **3 months ending 31st March, 2014 (Rs., in 000's)**

	January, 2014	Feb. 2014	March, 2014
Opening cash balances	545	315	65
Add: Receipts:			
From Debtors	2,070	1,900	1,850
Sale of Investments	—	700	—
Sale of Plant	—	—	50
Total (A)	2,615	2,915	1,965
Deduct: Payments			
Creditors	1,645	1,355	1,280
Expenses	255	210	195
Capital Expenditure	—	800	—
Payment of dividend	—	485	—
Purchase of investments	400	—	200
Total payments (B)	2,300	2,850	1,675
Closing cash balance (A - B)	315	65	290

(b) **Statement of Sources and uses of Funds for the Three Month Period Ending 31st March, 2014**

Sources:	Rs. '000	Rs. '000
Funds from operation:		
Net profit	390	
Add: Depreciation	180	570
Sale of plant		50
		620
Decrease in Working Capital		665
Total		1,285
0BUses:		
Purchase of plant		800
Payment by dividends		485
Total		1,285

Statement of Changes in Working Capital

	January,14 Rs. 000	March, 14 Rs. 000	Increase Rs. 000	Decrease Rs. 000
Current Assets				
Cash in hand and at Bank	545	290		255
Short term Investments	300	200		100
Debtors	2,570	2,350		220
Stock	1,300	1,000		300
	4,715	3,840		
Current Liabilities				
Trade Creditors	2,110	1,900	210	—
Other Creditors	200	200	—	—
Tax Due	320	320	—	—
	2,630	2,420		
Working Capital	2,085	1,420		
Decrease		665	665	
	2,085	2,085	875	875

(Sol-2)

Projected Profit and Loss Account for the year 3

	Year 2 Actual (Rs. in lakhs)	Year 3 Projected (Rs. in lakhs)		Year 2 Actual (Rs. in lakhs)	Year 3 Projected (Rs. in lakhs)
To Materials consumed	350	420	By Sales	1,000	1,200
To Stores	120	144	By Misc. Income	10	10
To Mfg. Expenses	160	192			
To Other expenses	100	150			
To Depreciation	100	100			
To Net profit	180	204			
	1,010	**1,210**		**1,010**	**1,210**

Cash Flow:

	(Rs. in lakhs)
Profit	204
Add: Depreciation	100
	304
Less: Cash required for increase in stock	50
Net cash inflow	254

Available for servicing the loan: 75% of Rs. 2,54,00,000 or Rs. 1,90,50,000

Working Notes:

(i)   Material consumed in year 2: 35% of sales.

Likely consumption in year 3 : Rs.1,200 x $\dfrac{35}{100}$ or 420 (lakhs)

(ii)   Stores are 12% of sales, as in year 2.

(iii)   Manufacturing expenses are 16% of sales.

Note : The above also shows how a projected profit and loss accounts is prepared.

Homework

(Sol-1)

Cleared Funds Forecast

	7 Jan 14 (Monday) Rs.	8 Jan 14 (Tuesday) Rs.	9 Jan 14 (Wednesday) Rs.	10 Jan 14 (Thursday) Rs.	11 Jan 14 (Friday) Rs.
Receipts					
W Ltd	1,30,000	0	0	0	0
X Ltd	0	0	0	1,80,000	0
(a)	1,30,000	0	0	1,80,000	0
Payments					
A Ltd	45,000	0	0	0	0
B Ltd	0	0	75,000	0	0
C Ltd	0	0	95,000	0	0
Wages	0	0	0	0	12,000
Salaries	56,000	0	0	0	0
Petty Cash	200	0	0	0	0
Stationery	0	0	300	0	0
(b)	1,01,200	0	1,70,300	0	12,000
Cleared excess Receipts over payments (a) – (b)	28,800	0	(170,300)	80,000	(12,000)
Cleared balance b/f	200,000	228,800	228,800	58,500	238,500
Cleared balance c/f (c)	2,28,800	2,28,800	58,500	2,38,500	2,26,500
Uncleared funds float					
Receipts	180,000	180,000	180,000	0	0
Payments	(170,000)	(170,300)	0	(6,500)	(6,500)
(d)	10,000	9,700	180,000	(6,500)	(6,500)
Total book balance c/f (c) + (d)	2,38,800	2,38,500	2,38,500	2,32,000	2,20,000

(Sol-2)

Workings:

Collection from debtors:

<div align="right">(Amount in Rs.)</div>

	February	**March**	**April**	**May**	**June**	**July**	**August**	**September**
Total sales	1,20,000	1,40,000	80,000	60,000	80,000	1,00,000	80,000	60,000
Credit sales (80% of total sales)	96,000	1,12,000	64,000	48,000	64,000	80,000	64,000	48,000
Collections: One month		72,000	84,000	48,000	36,000	48,000	60,000	48,000
Two months			24,000	28,000	16,000	12,000	16,000	20,000
Total collections			1,08,000	76,000	52,000	60,000	76,000	68,000

Monthly Cash Budget for Six months, April to September, 2014

<div align="right">(Amount in Rs.)</div>

Receipts:	**April**	**May**	**June**	**July**	**August**	**September**
Opening balance	20,000	20,000	20,000	20,000	20,000	20,000
Cash sales	16,000	12,000	16,000	20,000	16,000	12,000
Collection from debtors	1,08,000	76,000	52,000	60,000	76,000	68,000
Total cash available (A)	1,44,000	1,08,000	88,000	1,00,000	1,12,000	1,00,000
Payments:						
Purchases	48,000	64,000	80,000	64,000	48,000	80,000
Wages & salaries	9,000	8,000	10,000	10,000	9,000	9,000
Interest on debentures	3,000	—	—	3,000	—	—
Tax payment	—	—	—	5,000	—	—
Total payments (B)	60,000	72,000	90,000	82,000	57,000	89,000
Minimum cash balance desired	20,000	20,000	20,000	20,000	20,000	20,000
Total cash needed (C)	80,000	92,000	1,10,000	1,02,000	77,000	1,09,000
Surplus - deficit (A-C)	64,000	16,000	(22,000)	(2,000)	35,000	(9,000)
Investment/financing						
Temporary Investments	(64,000)	(16,000)	—	—	(35,000)	—
Liquidation of temporary investments or temporary borrowings	—	—	22,000	2,000	—	9,000
Total effect of investment/financing (D)	(64,000)	(16,000)	22,000	2,000	(35,000)	9,000
Closing cash balance (A+D-B)	20,000	20,000	20,000	20,000	20,000	20,000

CAPITAL BUDGETING AND RISK ANALYSIS
To be discussed only in classroom

(Sol-1)

Sensitivity Analysis

Note :

Base NPV

Year	CF	DF @ 10%	PV
1	20000 (60-40) = 400000	0.9091	3,63,640
2	30000 (60-40) = 600000	0.8264	4,95,840
3	30000 (60-40) = 600000	0.7513	450180
			1310260
			(-) PV (0.(1000000)
			NPV 310260

Sensitivity Analysis

(a)   S.P. (↓ 10%)

Year	CF	DF @ 10%	PV
1	20000 (54-40) = 280000	0.9091	
2	30000 (54-40) = 420000	0.6264	
3	30000 (54-40) = 420000	0.7513	917182
			(-) (1000000)
			npv 82818

$$\% \text{ of Sens} = \frac{310260 - (82818)}{310260} \times 100$$

$$= 126.69\%$$

(b)   Unit Cost (↑ 10%)

Year	CF	DF @ 10%	PV
1	20000 (60-44) = 320000	0.9091	
2	30000 (60-44) = 480000	0.8264	
3	30000 (60-44) = 480000	0.7513	1048208
			(1000000)
			48208

$$\% \text{ of Sens} = \frac{310260 - 48208}{310260} \times 100 = 84.46\%$$

(c)   Sales Volume (↓ 10%)

Year	CF	DF @ 10%	PV
1	18000 (60-40) = 360000	0.9091	
2	27000 (60-40) = 540000	0.8264	
3	27000 (60-40) = 540000	0.7513	1179234
			(1000000)
			179234

% of Sens : $= \dfrac{310260 - 179234}{310260}$ x 100 = 42.23%

(d)   Initial Invt (↑ 10%)

Revised NPV = 310260 – 1000000

= 210260

% of Sens $= \dfrac{310260 - 210260}{310260}$ x 100

= 32.23%

(e)   Project Life Time

Year	Disc. CF/PV	CCF
1	363640	363640
2	495840	859480
3	450780	

= 2 years + $\dfrac{140580}{450780}$ (1000000 = 859480)

= 2.31 years

% of Sens = $\dfrac{3 - 2.31}{3}$ x 100 = 23%

(Sol-2)   The Risk Adjusted Discount Rate (RADR) is determined by the following formula:

RADR $= R_f + [R_j \times (k-R_f)]$

where R_f = Risk free rate

k   = Cost of capital

R_j = Risk index for the project

Calculation of Risk Adjusted Discount Rate (RADR):

Zeta-10= 10 + [1.80 X (.15-.10)]   = 0.19 or 19%

Meta-10= 10 + [1.00 X (.15-.10)]   = 0.15 or 15%

Neta-10= 10 + [0.60 X (.15- 10)]   = 0.13 or 13%

Calculation of Risk Adjusted NPV

	Zeta - 10
Annual Inflows	Rs. 6,00,000
pvaf(194)	2.639
PV of Inflows (Rs. 6,00,000 X 2.639)	Rs. 15,83,400
Cost of Investment	15,00,000
Net Present Value	83,400

Meta - 10

Year	Cash inflows	$PV_{(15,n)}$	Present Value
1	Rs. 6,00,000	0.870	Rs. 5,22,000
2	4,00,000	0.756	3,02,400
3	5,00,000	0.658	3,29,000
4	2,00,000	0.572	1,14,000
Total PV			12,67,400
Cost of Investment			11,00,000
Net Present Value			1,67,400

Neta -10

Year	Cash inflows	$PV_{(13,n)}$	Present Value
1	Rs. 4,00,000	0.885	Rs. 3,54,000
2	6,00,000	0.783	4,69,860
3	8,00,000	0.693	5,54,400
4	12,00,000	0.613	7,35,600
Total PV			21,13,860
Cost of Investment			19,00,000
Net Present Value			2,13,860

Project Neta - 10 has the highest Net Present Value (NPV). It should be accepted by the management for implementation.

Homework

(Sol-1)

$$NPV = \frac{10,00,000 \times (0.90)}{(1.05)} + \frac{15,00,000 \times (0.85)}{(1.05)^2} + \frac{20,00,000 \times (0.82)}{(1.05)^3} + \frac{25,00,000 \times (0.78)}{(1.05)^4}$$

- 45,000 = Rs.5,34,570

LEASE FINANCING
To be discussed only in classroom

(Sol-1)

Discounting Factor:

Cost of finance 20% - Tax 35% = 13%.

(i)   PV of cash outflows under leasing alternative

Year-end	Lease rent after taxes P.A.	PVIFA at 13%	Total P.V.
1 - 5	Rs. 3,90,000	3.517	Rs. 13,71,630

PV of cash outflows under buying alternative

Year end	Loan Installment	Tax advantage on Interest	Tax advantage on Depreciation	Net Cash Outflow	PVIF at 13%	Total PV
1	6,68,673	1,40,000	1,75,000	3,53,673	0.885	3,13,001
2	6,68,673	1,21,193	1,31,250	4,16,230	0.783	3,25,908
3	6,68,673	98,624	98,438	4,71,611	0.693	3,26,826
4	6,68,673	71,542	73,828	5,23,303	0.613	3,20,785
5	6,68,673	38,819	55,371	5,74,483	0.543	3,11,944
Total PV outflows						15,98,464
Less: PV of Salvage Value (Rs. 4,00,000 *0.543)						2,17,200
						13,81,264
Less: PV of tax saving on short term capital loss (4,74,609 – 4,00,000) * 35% * .543						
						14,179
NPV of Cash outflow						13,67,085

Working Notes:

(1)   Schedule of Debt Payment

Yearend	Opening balance	Interest @ 20%	Repayment	Closing Balance	Principal Amount
1	20,00,000	4,00,000	6,68,673	17,31,327	2,68,673
2	17,31,327	3,46,265	6,68,673	14,08,919	3,22,408
3	14,08,919	2,81,784	6,68,673	10,22,030	3,86,889
4	10,22,030	2,04,406	6,68,673	5,57,763	4,64,267
5	5,57,763	1,10,910*	6,68,673	0	5,57,763

*Balancing Figure

(2)   Schedule of Depreciation

Year	Opening WDV	Depreciation	Closing WDV
1	20,00,000	5,00,000	15,00,000
2	15,00,000	3,75,000	11,25,000
3	11,25,000	2,81,250	8,43,750
4	8,43,750	2,10,938	6,32,812
5	6,32,812	1,58,203	4,74,609

(3)   EMI = Rs. 20,00,000 / Annuity for 5 years @ 20% = i.e. Rs. 20,00,000 / 2.991 = Rs.6,68,673.

Advice: Company is advised to borrow and buy not to go for leasing as NPV of cash outflows is lower in case of buying alternative.

Note: Students may note that the cost of capital of the company given in the question is 14% at which cash flows may also be discounted.

(ii)   Evaluation from Lessor's Point of View

	(1)	(2)	(3)	(4)	(5)
Lease Rent	6,00,000	6,00,000	6,00,000	6,00,000	6,00,000
Less: Depreciation	5,00,000	3,75,000	2,81,250	2,10,938	1,58,203
EBT	1,00,000	2,25,000	3,18,750	3,89,062	4,41,797
Less: Tax @ 35%	35,000	78,750	1,11,563	1,36,172	1,54,629
EAT	65,000	1,46,250	2,07,187	2,52,890	2,87,168
Add: Depreciation	5,00,000	3,75,000	2,81,250	2,10,938	1,58,203
Cash Inflows	5,65,000	5,21,250	4,88,437	4,63,828	4,45,371
PV factor @ 14%	0.877	0.769	0.675	0.592	0.519
PV of inflows	4,95,505	4,00,841	3,29,695	2,74,586	2,31,148

Evaluation:

Aggregate PV of cash inflows	17,31,775
Add: PV of salvage value (4,00,000 x 0.519)	2,07,600
Add: Tax shelter on short-term capital loss (4,74,609 – 4,00,000) x 0.35 x 0.519	13,553
PV of all cash inflows	19,52,928
Cost of the machine	20,00,000
NPV	-47,072

Hence, leasing at this rate is not feasible.

(Sol-2)

(i)   The loan amount is repayable together with the interest at the rate of 16% on loan amount and is repayable in equal installments at the end of each year. The PVAF at the rate of 16% for 4 years is 2.798, the amount payable will be

Annual Payment = $\dfrac{Rs.5,00,000}{2.798}$ = Rs. 1,78,699 (rounded)

Schedule of Debt Repayment

End of Year	Total Principal Rs.	Interest Rs.	Principal Rs.	Principal Amount Outstanding Rs.
1	5,00,000	80,000	98,699	4,01,301
2	4,01,301	64,208	1,14,491	2,86,810
3	2,86,810	45,890	1,32,809	1,54,001
4	1,54,001	24,698*	1,54,001	———

* Balancing Figure

Tax Benefit on Interest and Depreciation

Year	Interest	Depreciation	Total	Tax Benefit
1	80,000	75,000	1,55,000	54,250
2	64,208	75,000	1,39,208	48,723
3	45,890	75,000	1,20,890	42,312
4	24,698	75,000	99,698	34,894

Present Value of Cash Flows under Borrow and Buying proposal

Year	Installment Rs.	Salvage Value (Rs.)	Tax Benefit (Rs.)	Net Flow (Rs.)	PVF @ 10.4%	PV (Rs.)
1	1,78,699		54,250	1,24,449	0.906	1,12,751
2	1,78,699		48,723	1,29,976	0.820	1,06,580
3	1,78,699		42,312	1,36,387	0.743	1,01,336
4	1,78,699	(2,00,000)	34,894	-56,195	0.673	-37,819
					3.142	2,82,848

Present Value of Cash Flows under Leasing Option

Rs. 1,00,000 (1- 0.35) x 3.142 = Rs. 2,04,230

Hence leasing should be preferred as cash flow is least in this option.

(ii)   Analyzing financial viability from Lessor's point of view

(a)   Determination of Cash Flow after Tax

	Rs.
Annual Rent	1,00,000
Less: Depreciation	75,000
EBT	25,000
Less: Tax @ 35%	8,750

Profit after Tax	16,250
Add: Depreciation	75,000
	91,250

(b)   Computation of Net Present Value

	Rs.
Present Value of Cash inflow (Rs. 91,250 x 2.914)	2,65,903
Add: PV of Salvage Value (Rs. 2,00,000 x 0.592)	1,18,400
	3,84,303
Purchase Price	(5,00,000)
NPV	(1,15,697)

Thus proposal is not financially viable from lessor's point of view.

(iii)   Break Even Lease Rent

	Rs.
Cost of Computer	5,00,000
Less: PV of Salvage Value (Rs. 2,00,000 x 0.592)	1,18,400
	3,81,600
PVIAF (14%,4)	2.914
CFAT Desired	1,30,954
Less: Depreciation	75,000
EAT	55,954
Add: Taxes	30,129
EBT	86,083
Add: Depreciation	75,000
Lease Rental (Desired)	1,61,083

Homework

(Sol-1)

From the view point of lessee

(i) Lease

   Initial Investment

   CF

   Lease Rent   (900000)

   Tax Deb. @ 40%   3,60,000

               (5,40,000)

   NPV

Year	CF	DF @ 9%	Net CF
1-5	(5,40,000)	3.890)	21,00,600

DF/COC   = I (1-t)

      = 15 (1-0.4)

Year	Op.	Int. @ 15%	Principal	CI
1	30,00,000	4,50,000	4,44,935	25,55,065
2	25,55,065	3,83,262	5116.75	2093390
3	20,43,390	3,06,509	5,88,426	14,59,964
4	14,54,964	2,18,245	6,76,690	7,78,274
5	7,78,274	1,16,661	7,78,274	

Depreciation (WDV 25%)

Year	Op.	WDV	CI
1	30,00,000	7,50,000	
2		5,62,500	
3		4,21,875	
4		3,16,406	
5		2,37,305	7,11,914

Salvage   2,00,000

(711914-200000) x 40% 2,04,766

            4,04,766

CF

Year	First (I+P)	Tax Deb. @ 40% (x+D)	Net CF
1	(894935)	480000	(414935)
2	(894935)	378304	(576631)
3	(894935)	291354	(603581)
4	(894935)	213860	(681075)
5	(894935)	141580	(753349)

NPV

Year	CF	DF @ 9%	PV
1	(414935)	0.9174	(380661)
2	(516631)	0.8417	(434848)
3	(603581)	0.7722	(4682297)
4	(681075)	0.7084	(482473)
5	(753349) + 404766	0.6499	(226544)
			(1992755)
			(-) -
			(1992755)

(Sol-2)

Option I: To buy the asset:

In this option the firm has to pay Rs. 10,000 down and the balance Rs. 1,00,000 together with interest @ 15% is payable in 10 annual equal instalments. The instalment amount may be calculated by dividing Rs. 1,00,000 by the PVAF for 10 years at 15% i.e.

Annual repayment = Rs. 1,00,000/5.0188 = Rs. 19,925

The cash flows of the borrowing and purchase option may be computed as follows:

Year	Instalment Rs.	Interest Rs.	Repayment Rs.	Balance Rs.
1	19,925	15,000	4,925	95,075
2	19,925	14,261	5,664	89,411
3	19,925	13,412	6,513	82,898
4	19,925	12,435	7,490	75,408
5	19,925	11,311	8,614	66,794
6	19,925	10,019	9,906	56,888
7	19,925	8,533	11,392	45,496

8	19,925	6,824	13,101	32,395
9	19,925	4,859	15,066	17,329
10	19,925	2,596*	17,329	-

* Difference between the outstanding balance and the last instalment (i.e. Rs. 19,925 – Rs. 17,329 = Rs. 2,596)

Year	Installment (1) Rs.	Interest (2) Rs.	Depreciation (3) Rs.	Tax Shield 50% (2 + 3) (4) Rs.	Net CF(1-4) (5) Rs.	PVF (6)	PV (7) Rs.
0	10,000	-	-	-	-	1.000	10,000
1	19,925	15,000	11,000	13,000	6,925	.870	6,025
2	19,925	14,261	11,000	12,631	7,294	.756	5,514
3	19,925	13,412	11,000	12,206	7,719	.658	5,079
4	19,925	12,435	11,000	11,718	8,207	.572	4,694
5	19,925	11,311	11,000	11,156	8,769	.497	4,358
6	19,925	10,019	11,000	10,510	9,415	.432	4,067
7	19,925	8,533	11,000	9,767	10,158	.376	3,819
8	19,925	6,824	11,000	8,912	11,013	.327	3,601
9	19,925	4,859	11,000	7,930	11,995	.284	3,407
10	19,925	2,596	11,000	6,798	13,127	.247	3,242
	Present value of total outflows						-53,806
10	Salvage value (after tax)		10,000	-	-	.247	+2,470
	Net present value of outflows						-51,336

It may be noted that (i) depreciation of Rs. 11,000 has been provided for all the 10 years. This is 10% of the original cost of Rs. 1,10,000. (ii) The asset is fully depreciated during its life of 10 years, therefore, the book value at the end of 10th year would be zero. As the asset is having a salvage value of Rs. 20,000, this would be capital gain and presuming it to be taxable at the normal rate of 50%, the net cash inflow on account of salvage value would be Rs. 10,000 only. This is further discounted to find out the present value of this inflow.

Option II – Evaluation of Lease Option:

In case the asset is acquired on lease, there is a lease rent of Rs. 15,000 payable at the end of next 10 years. This lease rental is tax deductible, therefore, the net cash outflow

would be only Rs. 7,500 (after tax). The PVAF for 10 years @ 15% is 5.0188. So, the present value of annuity of Rs. 7,500 is

Present value of annuity of outflow = Rs. 7,500 ´ 5.0188 = Rs. 37,641.

Advice: If the firm opts to buy the asset, the present value of outflow comes to Rs. 51,336; and in case of lease option, the present value of outflows comes to Rs. 37,641. Hence, the firm should opt for the lease option. In this way, the firm will be able to reduce its costs by Rs. 13,695 i.e. Rs. 51,336 – Rs. 37,641. This may also be referred to as Net Benefit of Leasing.

Note: Students may also discount cash flows under both alternatives at after tax cost i.e. 15% (1 – 0.5) = 7.5%. Discounting will not have any impact on this decision since any discount factor will lead to present value of lease to be less than that of present value of debt.

(Sol-3)

Borrowing option:

Annual Instalment = Rs.5,00,000/- / 5 = Rs.1,00,000/-

Annual depreciation = Rs.5,00,000/- / 5 = Rs.1,00,000/-

Computation of net cash outflow:

Year	Principal (Rs.)	Interest (Rs.)	Total (Rs.)	Tax Saving Depn. &Interest (Rs.)	Net cash Outflow(Rs.)	PV @ 8%†	Total PV (Rs.)
1	1,00,000	50,000	1,50,000	45,000	1,05,000	0.926	97,230
2	1,00,000	40,000	1,40,000	42,000	98,000	0.857	83,986
3	1,00,000	30,000	1,30,000	39,000	91,000	0.794	72,254
4	1,00,000	20,000	1,20,000	36,000	84,000	0.735	61,740
5	1,00,000	10,000	1,10,000	33,000	77,000	0.681	52,437
							3,67,647
Less: Present value of Inflows at the end of 5th year (Rs.50,000/- x 0.7) or Rs.35,000 x 0.681 =							23,835
PV of Net Cash outflows							3,43,812

Calculation of lease rentals:

Therefore, Required Annual after tax outflow = 3,43,812/3.993 = Rs.86,104/-*

Therefore, Annual lease rental = 86,104/0.70 = Rs.1,23,006/-

* If it is assumed that installment is payable in the beginning of the year then lease rent shall be computed as follows:

Required Annual after tax outflow = 3,43,812/4.312 = Rs.79,734/-

Therefore, Annual lease rental   = 79,734/0.70   = Rs.1,13,906/-

Further, if it is assumed that the lease rent is payable in the beginning of the year and tax benefit accrue in arrears then lease rent shall be computed as follows:

Let 'R' be the lease rent

PV of Lease Rent   = 4.312R

PV of Tax Benefits   = 3.933 x 0.30R = 1.1979R

Accordingly

                3,43,812 = 4.312R - 1.1979R

                R = 1,10,405

Thus, lease rent at which lessor will be Break Even = Rs. 1,10,405

† Alternatively it can also be discounted at post tax cost of debt i.e. 8.00% (1 - 0.30) = 5.60%.

(Sol-4)

Workings

(i)   Annual loan repayment: Rs. $\dfrac{60,000}{5}$ Rs. 12,000

(ii)   Residual sale value at year 5   Rs.1,500

        (-) Commission at 8%   120

        Profit on sale   1,380

        (-) Tax @ 30%   414

        Net cash flow (Rs. 1,380 - Rs. 414)   Rs.966

(iii)   Net cash outflow under loan option –

Year	1 Rs.	2 Rs.	3 Rs.	4 Rs.	5 Rs.	Total Rs.
Principal repayment	12,000	12,000	12,000	12,000	12,000	60,000
Payment of Interest	7,200	5,760	4,320	2,880	1,440	21,600
(-) Tax Savings @ 30% on depreciation	(3,600)	(3,600)	(3,600)	(3,600)	(3,600)	(18,000)
Tax savings on Interest	(2,160)	(1,728)	(1,296)	(864)	(432)	(6,480)
Net out flow	13,440	12,432	11,424	10,416	9,408	57,120
Discount factor at 11%	0.901	0.812	0.731	0.659	0.593	3.696
PV of cash outflow	12,109	10,095	8,351	6,864	5,579	42,998
Less: PV of Post tax inflow at the end of year 5 (Rs. 966×0.593)						(573)
PV of net Cash outflows in 5 years						42,425

Computation of Annual Lease Rentals :

PV of post tax Annual Lease Rentals in 5 years should not exceed Rs.42,425.

Or say, PV of Post-tax Lease Rental for one year. Should not exceed

Rs. $\dfrac{42,425}{3.696} = Rs.11,479$

Rs.11479 post-tax   = [Rs. 11,479/(1-t)] pretax

                     = Rs. 11,479/(1 - 0.30) = Rs.16,398

Therefore, maximum pre-tax annual rental should be Rs.16,398

DIVIDEND DECISIONS

HOMEWORK

(Sol-1)

Goldilocks Ltd.

(i)   Walter's model is given by

$$P=\frac{D+(E\text{-}D)(r/K_e)}{K_e}$$

Where,

P = Market price per share.

E = Earnings per share = Rs. 10

D = Dividend per share = Rs. 8

r = Return earned on investment = 10%

K_e = Cost of equity capital = 1/12.5 = 8%

$$P=\frac{8+(10\text{-}8)\ \text{x}\ \dfrac{0.10}{0.08}}{0.08}=\frac{8+2\text{x}\dfrac{0.10}{0.08}}{0.08}$$

    = Rs. 131.25

(ii)   According to Walter's model when the return on investment is more than the cost of equity capital, the price per share increases as the dividend pay-out ratio decreases. Hence, the optimum dividend pay-out ratio in this case is nil.

So, at a pay-out ratio of zero, the market value of the company's share will be:

$$\frac{0+(10\text{-}0)\dfrac{0.10}{0.08}}{0.08}=\text{Rs.}156.25$$

(Sol-2)

(a)   M/s XY Ltd.

(i)   Walter's model is given by

$$P=\frac{D+(E\text{-}D)(r/K_e)}{K_e}$$

Where,

P = Market price per share.

E = Earnings per share = Rs.5

D = Dividend per share = Rs.3

r = Return earned on investment = 15%

K_e = Cost of equity capital = 12%

$$P = \frac{3+(5\text{-}3)\,x\,\dfrac{0.15}{0.12}}{0.12} = \frac{3+2x\,\dfrac{0.15}{0.12}}{0.12}$$

= Rs.45.83

(ii)   According to Walter's model when the return on investment is more than the cost of equity capital, the price per share increases as the dividend pay-out ratio decreases. Hence, the optimum dividend pay-out ratio in this case is nil.

So, at a pay-out ratio of zero, the market value of the company's share will be:

$$\frac{0+(5\text{-}0)\dfrac{0.15}{0.12}}{0.12} = \text{Rs.}52.08$$

(Sol-3)

Modigliani and Miller (M-M) – Dividend Irrelevancy Model:

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

Where,

P_0 = Existing market price per share i.e. Rs. 120

P_1 = Market price of share at the year-end (to be determined)

D_1 = Contemplated dividend per share i.e. Rs. 6.4

K_e = Capitalisation rate i.e. 9.6%.

(i)   (a)   Calculation of share price when dividend is declared:

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$120 = \frac{P_1 + 6.4}{1 + 0.096}$$

120 × 1.096 = P1 + 6.4

P_1 = 120 × 1.096 – 6.4

= 125.12

(b)   Calculation of share price when dividend is not declared:

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$120 = \frac{P_1 + 0}{1 + 0.096}$$

120 × 1.096 = P1 + 0

P_1 = 131.52

(ii)   Calculation of No. of shares to be issued:

(Rs. in lakhs)

Particulars	If dividend declared	If dividend not declared
Net Income	160	160
Less: Dividend paid	51.20	—
Retained earnings	108.80	160
Investment budget	320	320
Amount to be raised by issue of new shares (i)	211.20	160
Market price per share (ii)	125.12	131.52
No. of new shares to be issued (ii)	1,68,797.95	1,21,654.50
Or say	1,68,798	1,21,655

(Sol-4)

A.   When dividend is paid

(a)   Price per share at the end of year 1

$$100 = \frac{1}{1.109}\left(Rs.5 + P_1\right)$$

110 = Rs. 5 + P1

P_1 = 105

(b)   Amount required to be raised from issue of new shares

Rs. 10,00,000 – (Rs. 5,00,000 – Rs. 2,50,000)

Rs. 10,00,000 – Rs. 2,50,000 = Rs. 7,50,000

(c)   Number of additional shares to be issued

$$\frac{7,50,000}{105} = \frac{1,50,000}{21} = \text{shares or say 7143 shares}$$

(d)   Value of ABC Ltd.

(Number of shares × Expected Price per share)

i.e., (50,000 + 7,143) × Rs. 105 = Rs. 60,00,015

B.   When dividend is not paid

(a)   Price per share at the end of year 1

$$100 = \frac{P_1}{1.10}$$

$P_1 = 110$

(b)   Amount required to be raised from issue of new shares

Rs. 10,00,000 – Rs. 5,00,000 = Rs. 5,00,000

(c)   Number of additional shares to be issued

$$\frac{5,00,000}{110} = \frac{50,000}{11}$$ = shares or say 4545 shares.

(d)   Value of ABC Ltd.,

(50,000 + 4,545) × Rs.110

= Rs. 59,99,950

Thus, as per M.M. approach the value of firm in both situations will be the same.